3.3 Multimodal Transportation

This section describes the affected environment, analyzes potential impacts, and provides recommendations for mitigation measures for multimodal transportation, including motor vehicle traffic, transit, bicycle, and pedestrian modes. Parking conditions are also analyzed.

3.3.1 Affected Environment

Introduction

Existing conditions of the multimodal transportation network are described and illustrated on the following pages, along with planned conditions for the future, based on adopted transportation plans. It includes an assessment of the current infrastructure and operating conditions for all transportation modes. Additionally, in this section, impacts to transportation facilities and services resulting from the proposed land use alternatives will be assessed to determine applicable mitigation measures needed to accommodate the changes. In order to provide relevant details and constructive analysis, the project team conducted field visits, utilized existing data (such as traffic counts and transit timetables) and reviewed relevant plans for the area, including:

- 2013 Sound Transit Draft Environmental Impact Statement (DEIS) for the Lynnwood Link Extension
- City response letter to the 2013 Sound Transit Draft Environmental Impact Statement (DEIS) for the Lynnwood Link Extension
- 2011 Shoreline Transportation Master Plan (TMP) and amendments
- 2012 Shoreline Comprehensive Plan (CP)
- City of Shoreline Vision 2029 Plan
- City of Shoreline 2014-2019 Capital Improvement Plan (CIP)
- City of Shoreline 2015-2020 Transportation Improvement Plan (TIP)
- 2013 PSRC Growing Transit Communities Report (GTC)
- King County Metro Strategic Plan 2012
- Community Transit Long Range Plan 2011
- Sound Transit Long Range Plan 2005
- Point Wells Expanded Traffic Impact Analysis Report 2011

Existing Street Network

Regional Access

Interstate 5 (I-5) is a limited access freeway classified as a highway of statewide significance. It provides access from the subarea south to Northgate, the University District, Capitol Hill, Downtown Seattle, and beyond, as well as to Mountlake Terrace,

Lynnwood, and points north. Additionally, I-5 serves as the key corridor for express regional bus service in the area. The nearest access points to I-5 from the subarea are the NE 145th Street, NE 175th Street, and NE 205th Street interchanges.

Subarea Street Network

SR-99/Aurora Avenue N is a managed access highway and is also classified as a highway of statewide significance. It serves as a principal arterial in Shoreline. It lies directly west of the subarea, providing north-south mobility and business access along the corridor.

The principal arterials in the subarea are N-NE 175th Street and 15th Avenue NE, which form the southern and eastern edges. Minor arterials within the subarea include Meridian Ave N, N-NE 185th Street, and the portion of 5th Avenue NE south of NE 185th Street. **Figure 3.3-1** highlights the street classifications of the roadways within the subarea. The proposed light rail station location is identified on the map along with the proposed parking lot to the west of I-5.

The area is composed of a gridded network, with notable gaps across I-5, with the only east-west connections located along N-NE 175th Street, N-NE 185th Street, and N-NE195th Street (pedestrian/bicycle only).

Existing Roadway Operations

Concurrency Management System

The Washington State Growth Management Act (GMA) includes a transportation concurrency requirement. This means that jurisdictions must provide adequate public facilities and services to keep pace with a community's growth over time to maintain the Level of Service (LOS) goals stated in a community's comprehensive plan. The improvements can include capital improvements, such as intersection modifications, or other strategies such as transit service expansion or transportation demand management. As part of the process, a jurisdiction evaluates the operations of roadway segments or intersections in order to determine the relative impact from new development on the transportation network. The City of Shoreline has an adopted concurrency methodology to balance growth, congestion, and capital investment.

Level of Service Criteria for Intersections

A common metric to evaluate intersection operations is average seconds of delay per vehicle, which can be translated into a grade for Level of Service (LOS) as shown in **Table 3.3-1**. An additional metric is the evaluation of a roadway segment via the volume-to-capacity (V/C) ratio, which compares a roadway's expected vehicle demand against the theoretical capacity of that segment. These V/C ratios can also be translated into a LOS grades as shown in the table**.** The LOS concept is used to describe traffic operations by assigning a letter grade of A through F, where A represents free-flow conditions and F represents highly congested conditions. The City has adopted LOS D for signalized intersections on arterials, unsignalized intersecting arterials, and roadway segments on Principal and Minor Arterials[1].

[1] Average delay at signalized intersections is based on all vehicles that approach the intersection. Average delay for unsignalized intersections is based on the delay experienced by vehicles at the stop-controlled approaches.

Traffic Volumes

The existing conditions analysis uses data where available from the 2011 update to the TMP to describe current traffic operations, and supplements that information with more recent vehicle counts. As shown in **Figure 3.3-2** and detailed in **Table 3.3-2**, traffic volumes and congestion on streets bordering the proposed station are low, with V/C ratios below 0.8 for the PM peak period. The current LOS standard for a V/C ratio on Principal and Minor arterials within the City of Shoreline is 0.9. 5th Avenue NE to the north and south of NE 185th Street has fewer than 5,000 average daily traffic (ADT) volumes and experiences low levels of congestion. Within the subarea, the most congested corridors include N-NE 175th Street and Meridian Avenue N, with V/C ratios in the PM peak period between 0.8 and 0.9. N 175th Street carries the highest volumes, with over 30,000 ADT on the segment west of I-5, while it is substantially less east of I-5 with 18,000 ADT.

Intersection Evaluation

While standard traffic analysis techniques[2] indicate that all intersections currently operate within the City's adopted LOS standard, there are certain areas where congestion is noticeably higher, such as the intersections of Meridian Avenue N and N 175th Street, and Meridian Avenue N and N 185th Street as shown in **Figure 3.3-3**. Visual inspection of these intersections in the field suggests a higher level of peaking and long queues (10 to 30 vehicles) during the PM peak period.

Collision History

As shown in the **Figure 3.3-4**, there are a relatively low number of vehicle collisions within the subarea, with all intersections experiencing a crash rate below 1.0 per million entering vehicles (MEV). Intersections that experience a crash rate above 1.0 per MEV are deemed "High Accident Locations" based on standards specified in the Sound Transit DEIS. The only intersection with a crash rate near that threshold is at N 175th Street and Meridian Avenue N, with a value of .81. Between 2008 and 2011, this intersection had a yearly average of 4.80 accidents with property damage only and 4.00 accidents with injuries. No accidents with fatalities occurred within the subarea for the time period of 2008 to 2011. All other intersections in the subarea averaged below a combined 5.00 accidents per year. During this period, the only recorded pedestrian accident occurred at NE 175th Street and 5th Avenue NE. Bicycle accidents occurred in the subarea at the intersections of NE 175th Street and 5th Avenue NE, N 175th Street and Meridian Avenue N, and N 185th Street at Meridian Avenue N[3].

[2] Using the HCM 2010 methodology

[3] Information provided by Sound Transit DEIS for the Lynnwood Link Extension

Table 3.3-1 Level of Service Criteria For Intersection and Roadway Analysis

Level of Service (LOS)	Signalized Intersection Delay per Vehicle (seconds)	Unsignalized Intersection Delay per Vehicle (seconds)	Roadway Segment Volume-to-Capacity ratio (V/C)
A	**< 10**	**< 10**	**<.60**
B	**> 10 to 20**	**> 10 to 15**	**.60 - .70**
C	**> 20 to 35**	**> 15 to 25**	**.70-.80**
D	**> 35 to 55**	**> 25 to 35**	**.80 - .90**
E	**> 55 to 80**	**> 35 to 50**	**.90 – 1.0**
F	**> 80**	**> 50**	**> 1.0**

Source: 2010 Highway Capacity Manual and the 2011 City of Shoreline Transportation Master Plan

Table 3.3-2 Average Daily Traffic and PM Peak Hour Congestion for Existing Conditions

Street	Segment	Average Daily Traffic	PM Peak Hour Volume[4]	Volume-to-Capacity Ratio
East-West Corridors				
N 175th Street	West of I-5	30,770	1,135	.86
NE 175th Street	East of I-5	18,010	742	.56
N 185th Street	West of I-5	9,700	497	.64
NE 185th Street	East of I-5	7,130	380	.48
North-South Corridors				
5th Avenue NE	South of N 185th Street	3,360	159	.23
15th Avenue NE	North of N 175th Street	15,040	1,068	.56
Meridian Avenue N	North of N 175th Street	12,070	745	.85

Source: 2011 City of Shoreline Transportation Master Plan and updated traffic counts from 2013

[4] One-directional volume only, signifying the direction with the highest volume

Figure 3.3-1 Street Classifications in the Subarea

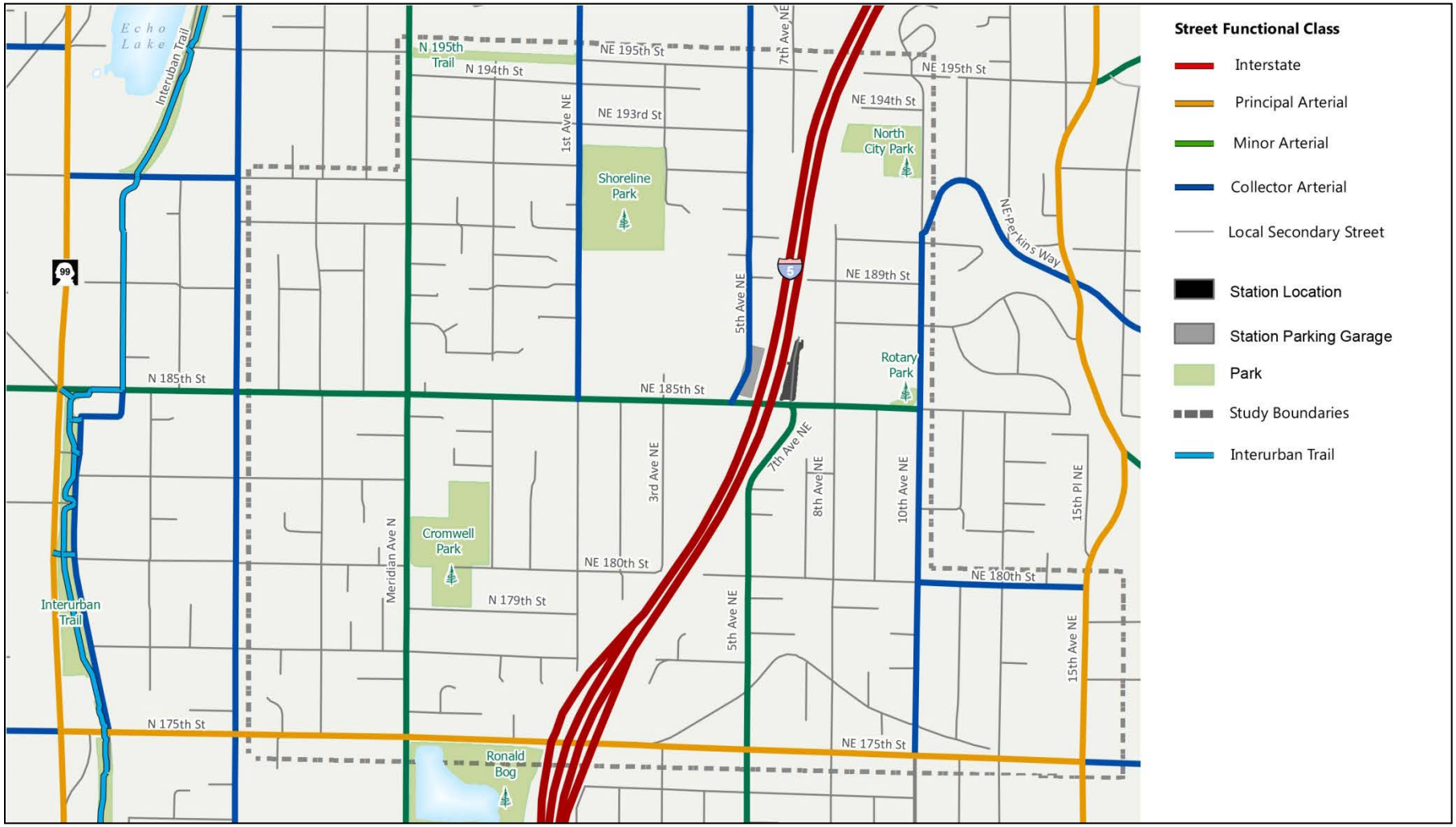


Figure 3.3-2 Average Daily Traffic and PM Peak Congestion (Existing Conditions)

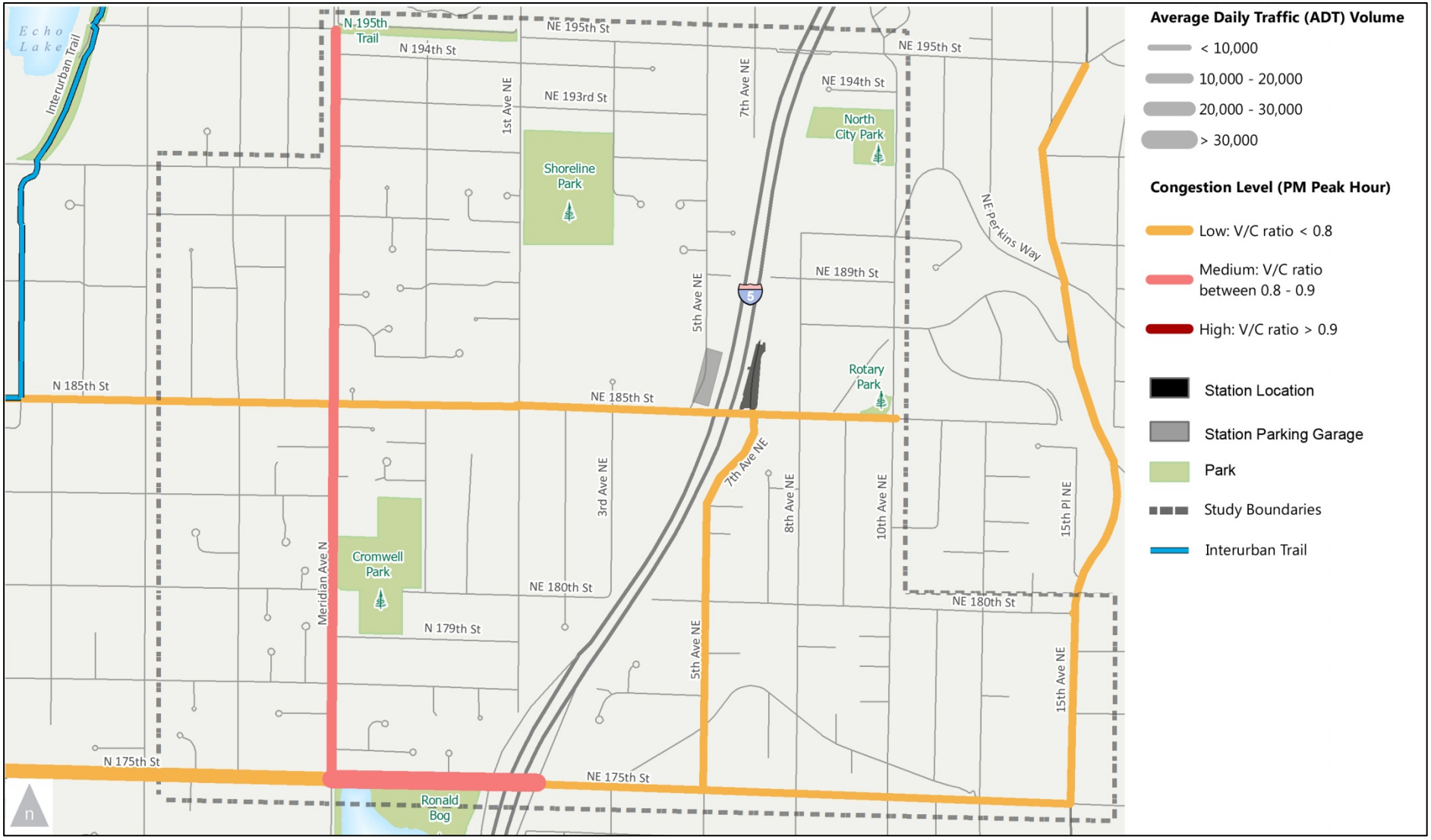


Figure 3.3-3 Intersection Level of Service (Existing Conditions)

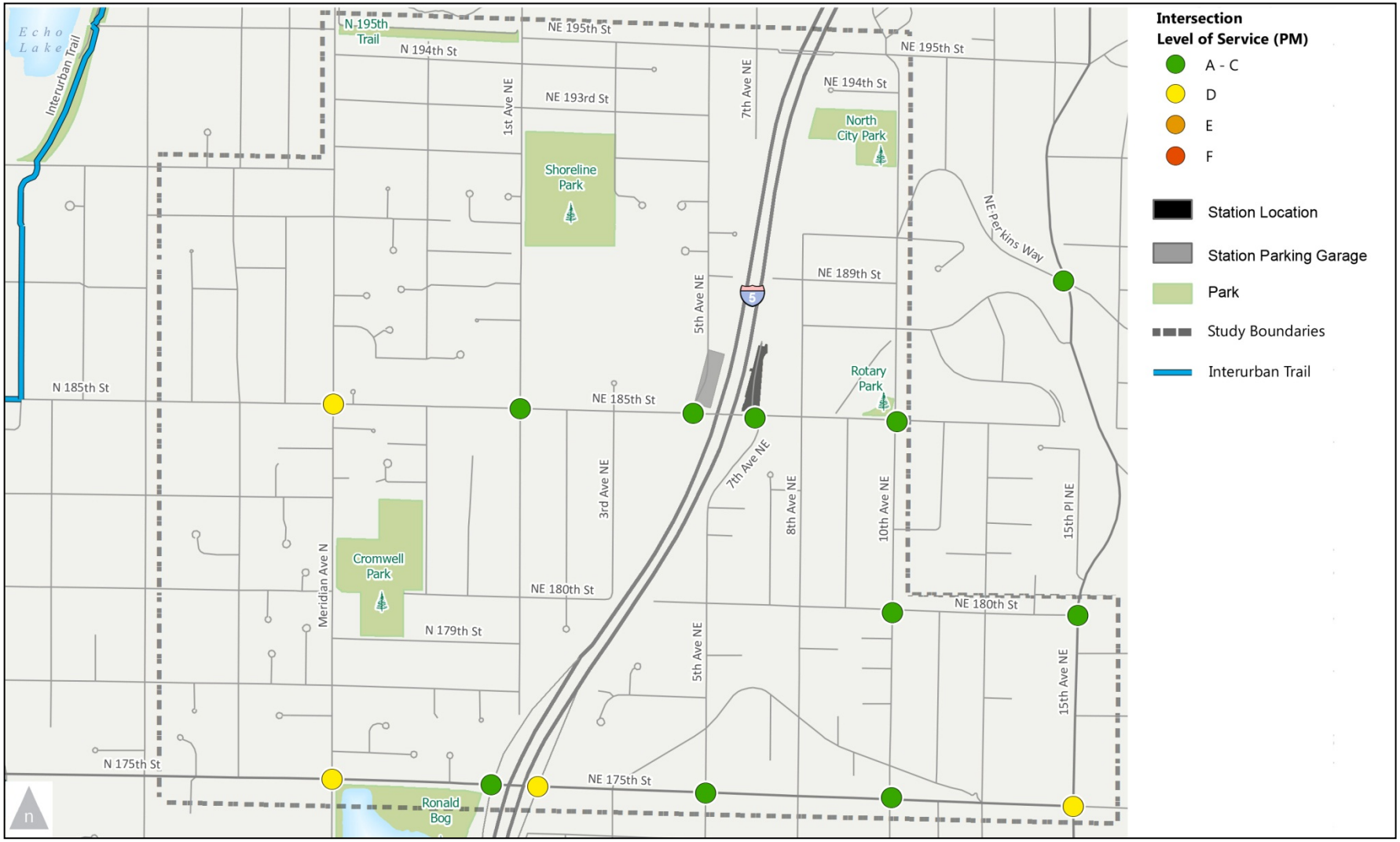
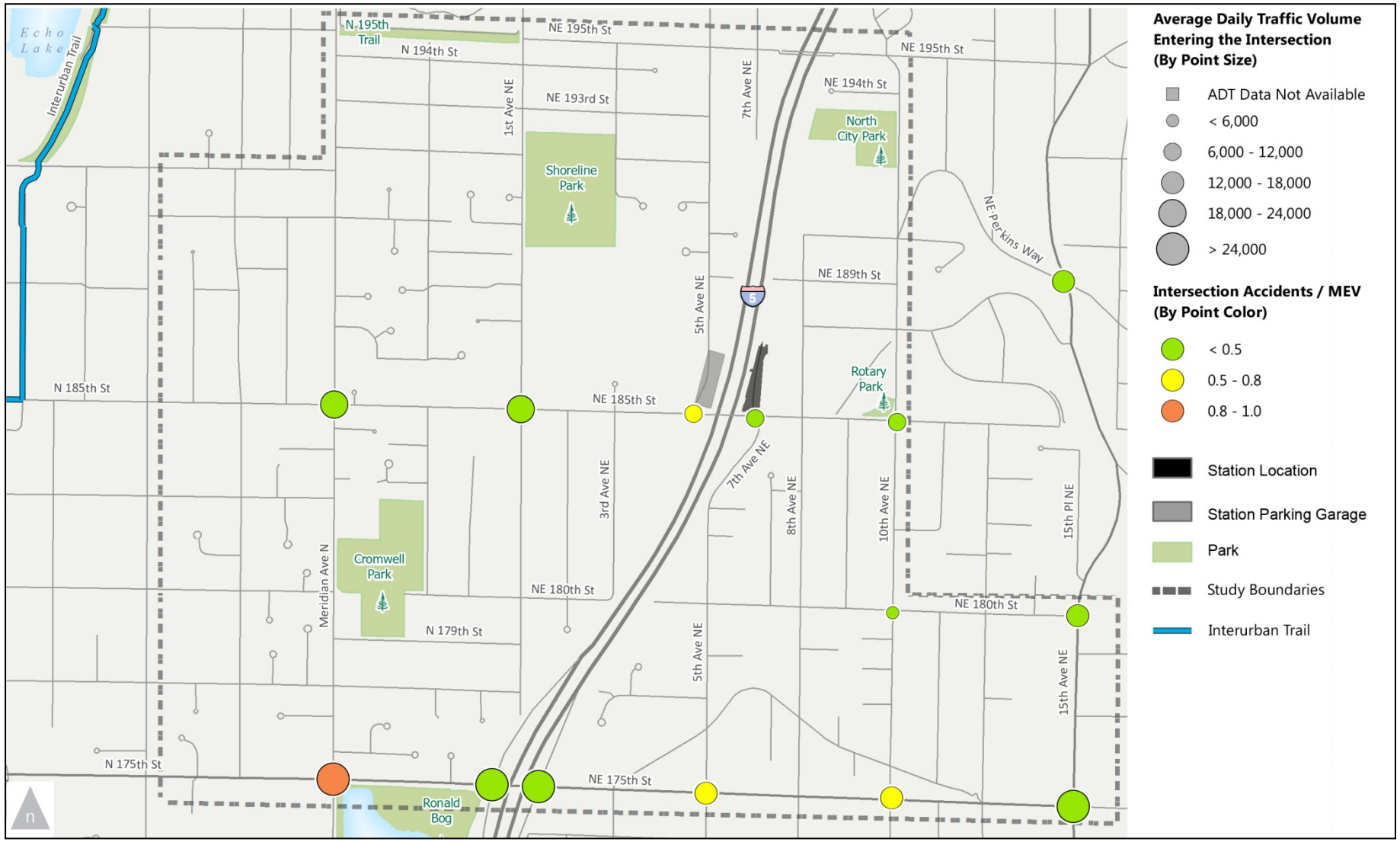


Figure 3.3-4 Accident Rate (Existing Conditions)



Transit Service Provision

Existing Conditions

The transit coverage within the subarea is provided by King County Metro. **Table 3.3-3** details the current headways and destinations serviced by routes that traverse near the proposed station, while **Figure 3.3-5** highlights the location of the routes. Most of the area is within a half-mile walk from a transit stop served during the peak periods. Direct service to the future light rail station location is currently provided by Route 348, with 30 minute headways during the peak and midday periods. There is a gap in east-west service during the off-peak periods, in part due to the low residential densities in the area, limited east-west arterials and lack of I-5 crossings, with the only service provided along N-NE 185th Street. The North City area along 15th Avenue NE is served by 30 minute peak and midday headways, and the combined frequency on NE 175th Street between 5th Avenue NE and 15th Avenue NE is every 15-20 minutes due to multiple routes serving that location.

Planned Transit Service

While the City of Shoreline does not have direct control over the transit service within its boundaries, a number of conceptual modifications with light rail deployment are identified in the TMP. This includes a potential diversion of existing routes to focus service on east-west connections to the station. As part of this process, the City will be engaged with Community Transit, King County Metro, and Sound Transit over the next two years as part of the development of a Transit Service Integration Plan. Community Transit is considering the future 185th station as a potential route terminus for the Swift Bus Rapid Transit line, which provides service to Everett along SR-99, and this assumption was incorporated into the Sound Transit DEIS. The Sound Transit DEIS analysis also assumed that five King County Metro routes would serve the 185th Street station with 15 minute peak headways and 15-30 minute off-peak headways.

Table 3.3-3 Existing Transit Service

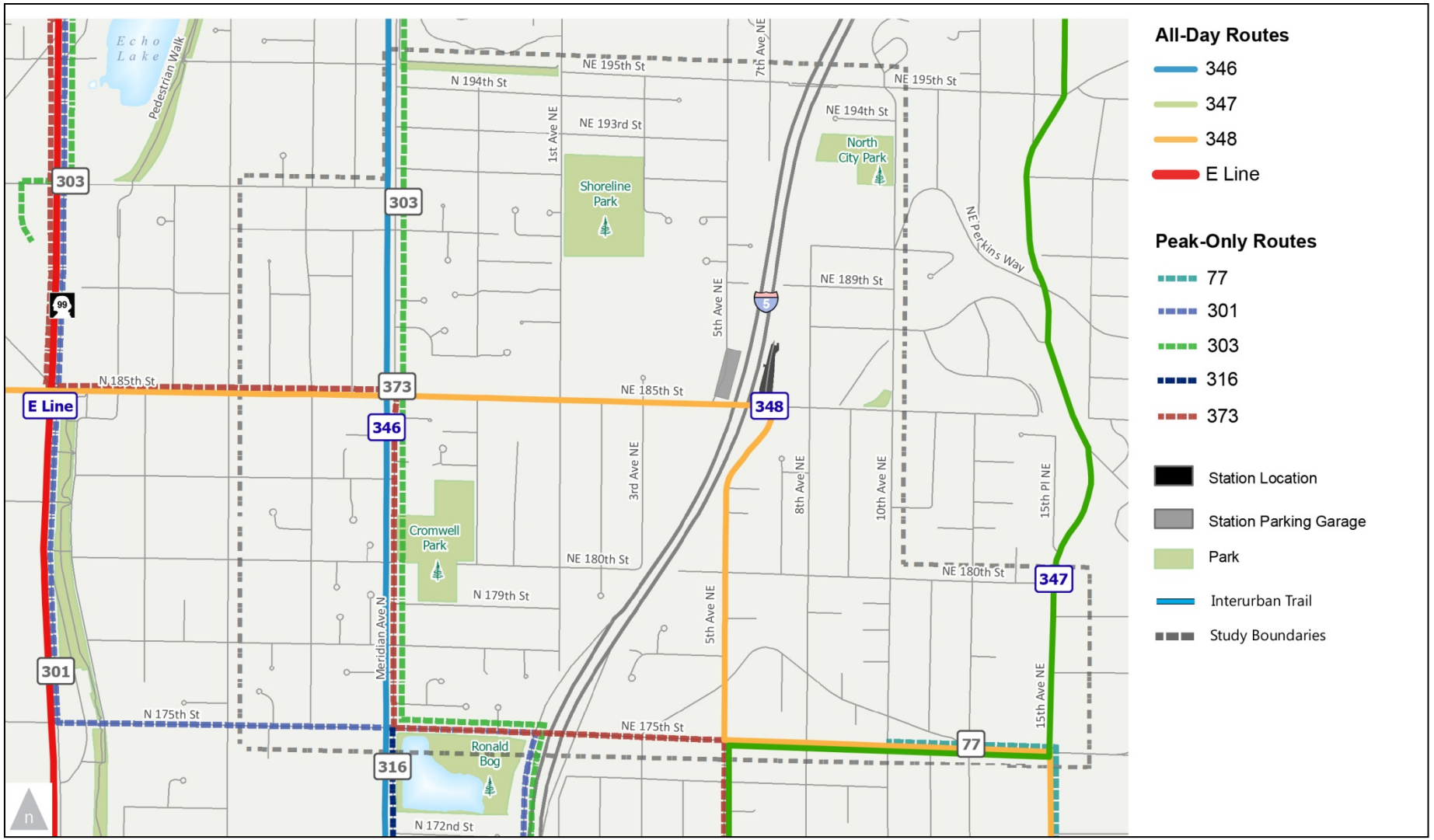
Route	Weekday Headways (in minutes)				Destinations Serviced
	AM Peak (6-9am)	Midday	PM Peak (3-6pm)	Evening	
All-day Routes					
346	30	30	30	60	Aurora Village Transit Center, Meridian Park Northgate
347	30	30	30	60	Northgate, Ridgecrest, North City, Mountlake Terrace
348	30	30	30	60	Richmond Beach, North City, Northgate
E Line	5-12	12	5-12	12-20	Downtown Seattle, Aurora Village Transit Center
Peak Period Routes					
77	15-25	-	15-30	-	North City, Maple Leaf, Downtown Seattle
301**	15	-	15	-	NW Shoreline, Aurora Village Transit Center, Shoreline Park and Ride, Downtown Seattle
303	15	-	15	60*	Shoreline Park and Ride, Aurora Village Transit Center, Meridian Park, Northgate, Downtown Seattle, First Hill
316	15-20	-	15-25	-	Meridian Park, Bitter Lake, Green Lake, Downtown Seattle
373	15	-	15	60*	Aurora Village Transit Center, Shoreline Park and Ride, Meridian Park, Maple Leaf, University District,

Source: King County Metro, 2014

*One outbound trip to Shoreline after 6 pm

** Provides limited bi-directional service during the AM and PM peak periods

Figure 3.3-5 Existing Transit Service



Existing Parking Conditions

Existing On-Street Parking Conditions

A substantial portion of the subarea is residential in character and has no on-street parking restrictions. A survey conducted for the Sound Transit DEIS evaluated parking supply and utilization for an area within a quarter-mile of the proposed station[5]. The analysis determined that there were 700 unrestricted on-street spaces and 300 off-street spaces in total with a utilization rate of 11 percent for the on-street spaces and 43 percent for the off-street locations. However, due to the limitations of the midday evaluation and the geographic area covered, a qualitative assessment was conducted for this EIS during the periods in which residential on-street parking utilization is typically higher, such as evenings and weekends. Within the entire subarea, there are approximately 5,900 on-street spaces available. Utilization was observed to be between approximately 10 percent and 20 percent for a majority of the non-arterial streets, with higher utilization observed near the North City area[6].

Park-and-Ride Facilities

Currently there are a number of smaller lots leased by King County Metro for park-and-ride facilities located at the southern edge of the subarea. This includes the 116 space lot at 1900 N 175th Street and the 25 space lot at 17920 Meridian Ave N. They are typically filled between 96 percent to over 100 percent of capacity on weekdays[7]. As part of the Lynnwood Link Extension Preferred

An example of low on-street parking utilization along residential streets in the station area

Alternative, a 500 parking space facility potentially would be located on the western edge of I-5 just north of NE 185th Street in the Washington State Department of Transportation right-of-way. The Sound Transit DEIS assumed that the garage would be fully utilized during the weekday daytime hours. During the PM peak hour, the DEIS estimated that 180 vehicles would exit the garage and 45 would enter. During the AM peak hour, it was estimated that 200 vehicles would enter the garage and 50 would exit.

[5] Data were collected mid-week in May 2012. Utilization was counted between 9 am and 11 am and between 1 pm and 4 pm.
[6] Observations were conducted in May 2014 on a Sunday between 7 am and 8 am.
[7] King County Metro Park and Ride utilization report First Quarter 2014

Existing Pedestrian and Bicycle Facilities

Existing Conditions

The subarea includes a variety of bicycle facility types, including sharrows, bike lanes, and separated paths. **Figure 3.3-6** details the current sidewalk and bicycle infrastructure while highlighting some gaps in connectivity within the station area. Currently, sharrows are present on some streets but there are no sidewalks or bicycle lanes connecting the North City area or areas south of NE 175th Street to the proposed station. Additionally, many of the local streets lack sidewalk coverage (although, it should be noted that traffic volumes tend to be low; so lacking sidewalk coverage may not be perceived as an issue).

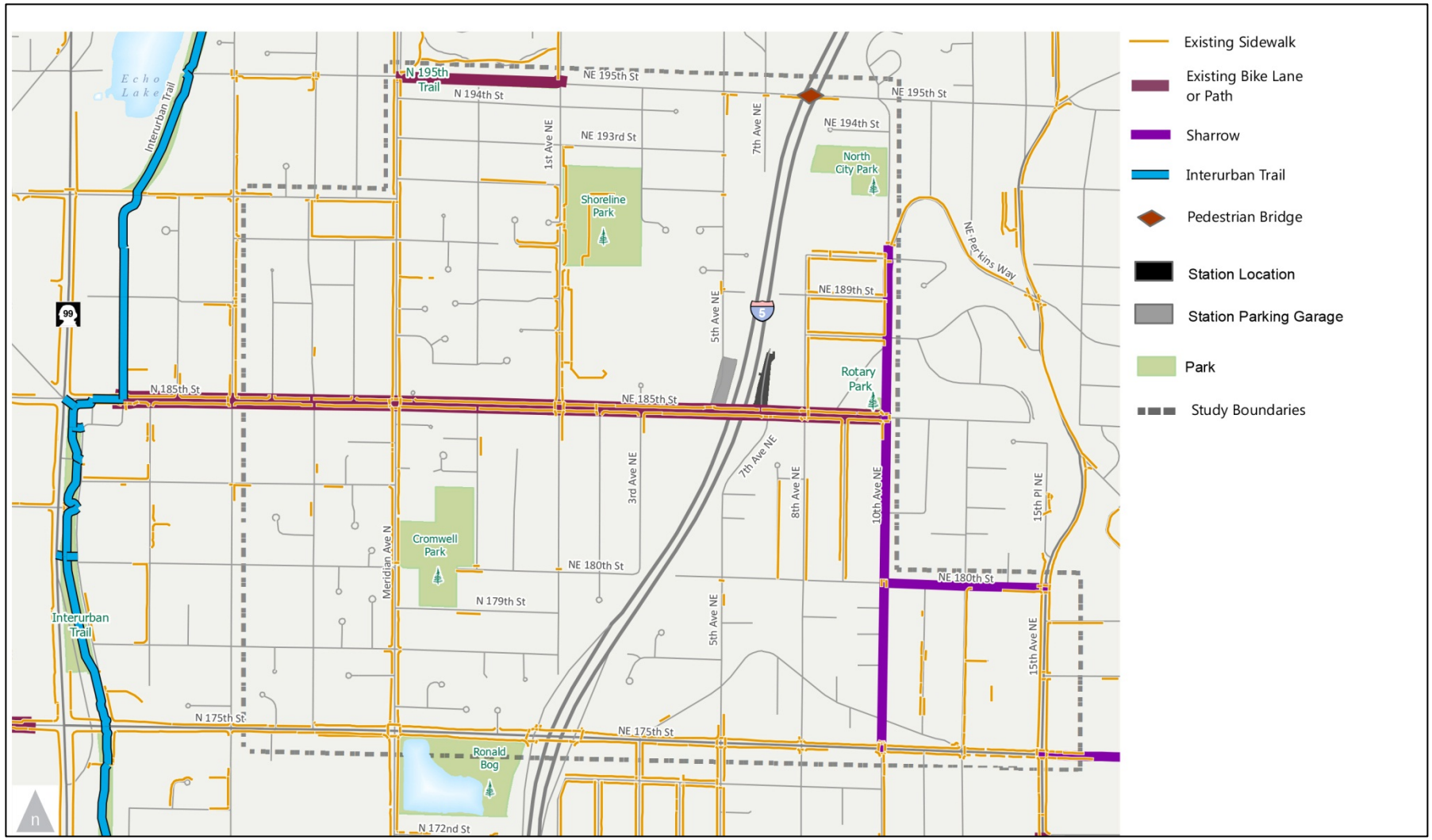
The neighborhoods within the subarea were primarily developed from the 1940s through the 1970s when the area was part of unincorporated King County. The street standards at that time did not require sidewalks, and as such, most of the non-arterial streets today do not have them. Bicycle lanes are not present on non-arterial streets as well.

When the City of Shoreline incorporated in 1995, it assumed jurisdiction of this area. The City works with the community to identify and prioritize capital transportation and infrastructure improvements throughout the city through development of the TMP, Transportation Improvement Plan, and Capital Improvement Plan.

Existing N 195th Street Trail

Recently completed bicycle lanes along NE 185th Street

Figure 3.3-6 Existing Pedestrian and Bicycle Facilities



Planned Multimodal Transportation Improvements

Pedestrian and Bicycle Improvements

The 2011 TMP identified a number of nonmotorized improvements within the subarea, some of which have recently been completed or are currently funded. The Interurban-Burke Gilman Connector on N-NE 195th Street, 10th Avenue NE and NE Perkins Way, as shown in **Figure 3.3-7**, is currently funded. This connector is a combination of on-street facilities, off-street trails, and signage to assist cyclists in navigating between the two major regional trails. Sound Transit will need to reconstruct the NE 195th Street pedestrian and bicycle bridge that crosses Interstate 5, as construction of the light rail alignment will necessitate its removal.

Figure 3.3-8 details the City's Pedestrian System Plan contained within the TMP, including dedicated north-south connections along 5th Avenue NE and Meridian Avenue N. This plan includes both existing sidewalks as well as those needed in order to create a complete pedestrian network in Shoreline. Planned sidewalks would provide a connection from the light rail station to the North City neighborhood through NE 180th Street and 10th Avenue NE. The Lynnwood Link Extension Preferred Alternative includes pedestrian improvements to the NE 185th Street bridge in order to provide a more comfortable walking environment and to connect the parking garage with the station.

Vehicle Traffic Improvements

Figure 3.3-9 highlights projects identified in the TMP that are needed to accommodate future planned growth and maintain the City's adopted transportation level of service standard. The two intersections of N 175th Street and N 185th Street along Meridian Avenue N have been identified for improvements (extended turn pockets, lane rechannelization, and signal coordination). Plans also call for the reconfiguration of Meridian Avenue N to allow for a two-way left turn lane from N 145th Street to N 205th Street. N 175th Street would have a similar treatment from Stone Avenue N to Meridian Avenue N. The TMP also identifies rechannelization of NE 185th Street with a two-way left turn lane from 1st Avenue NE to 10th Avenue NE to accommodate future traffic growth. Sound Transit has listed in the Lynnwood Link DEIS the following potential traffic improvements, some of which are consistent with the City's TMP planned projects.

Traffic Improvements Listed in Lynnwood Link DEIS by Sound Transit

Intersection	Potential Mitigation
N 185th Street / Meridian Avenue N	Add protected permissive phasing to the northbound and southbound left-turns
NE 185th Street / 5th Avenue NE (west of I-5)	Add a two-way left-turn lane or refuge area on 185th Street
NE 185th Street / 5th Avenue NE (east of I-5)	Add a two-way left-turn lane or refuge area on 185th Street
NE 185th Street / 7th Avenue NE	Add a two-way left-turn lane or refuge area on NE 185th Street
NE 185th Street / 10th Avenue NE	Add a right-turn pocket to the eastbound approach

Figure 3.3-7 Bicycle System Plan from the Transportation Master Plan

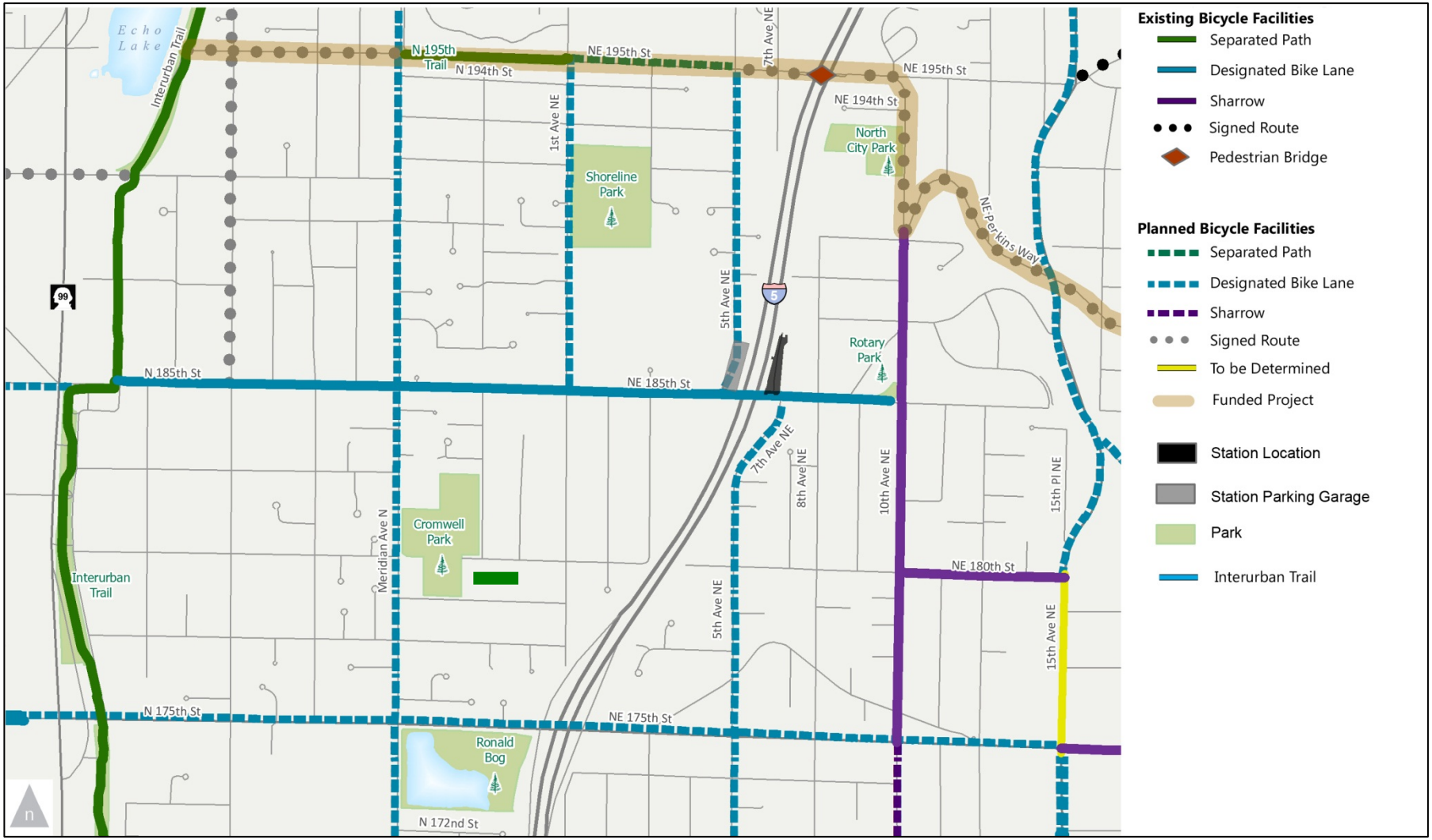


Figure 3.3-8 Pedestrian System Plan from the Transportation Master Plan

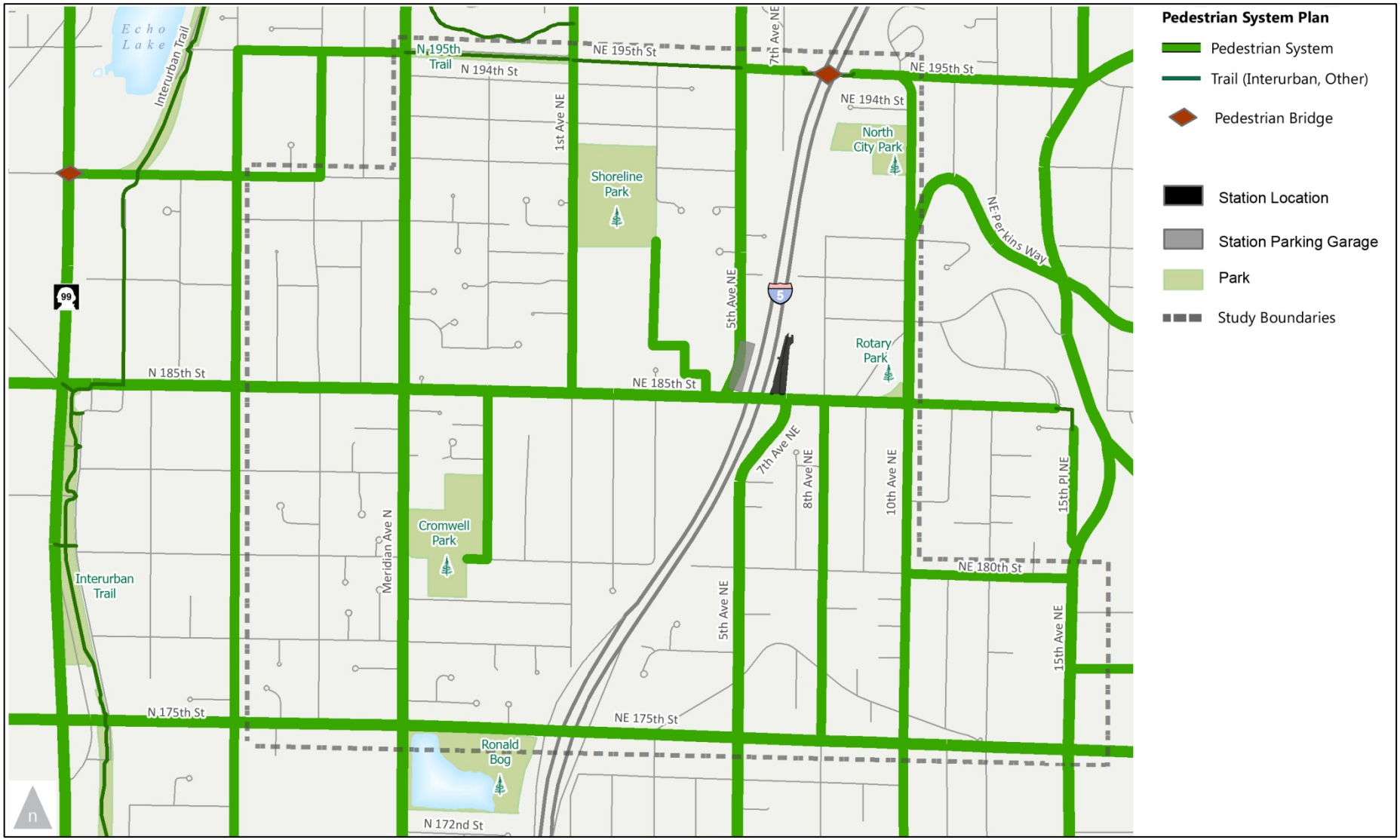
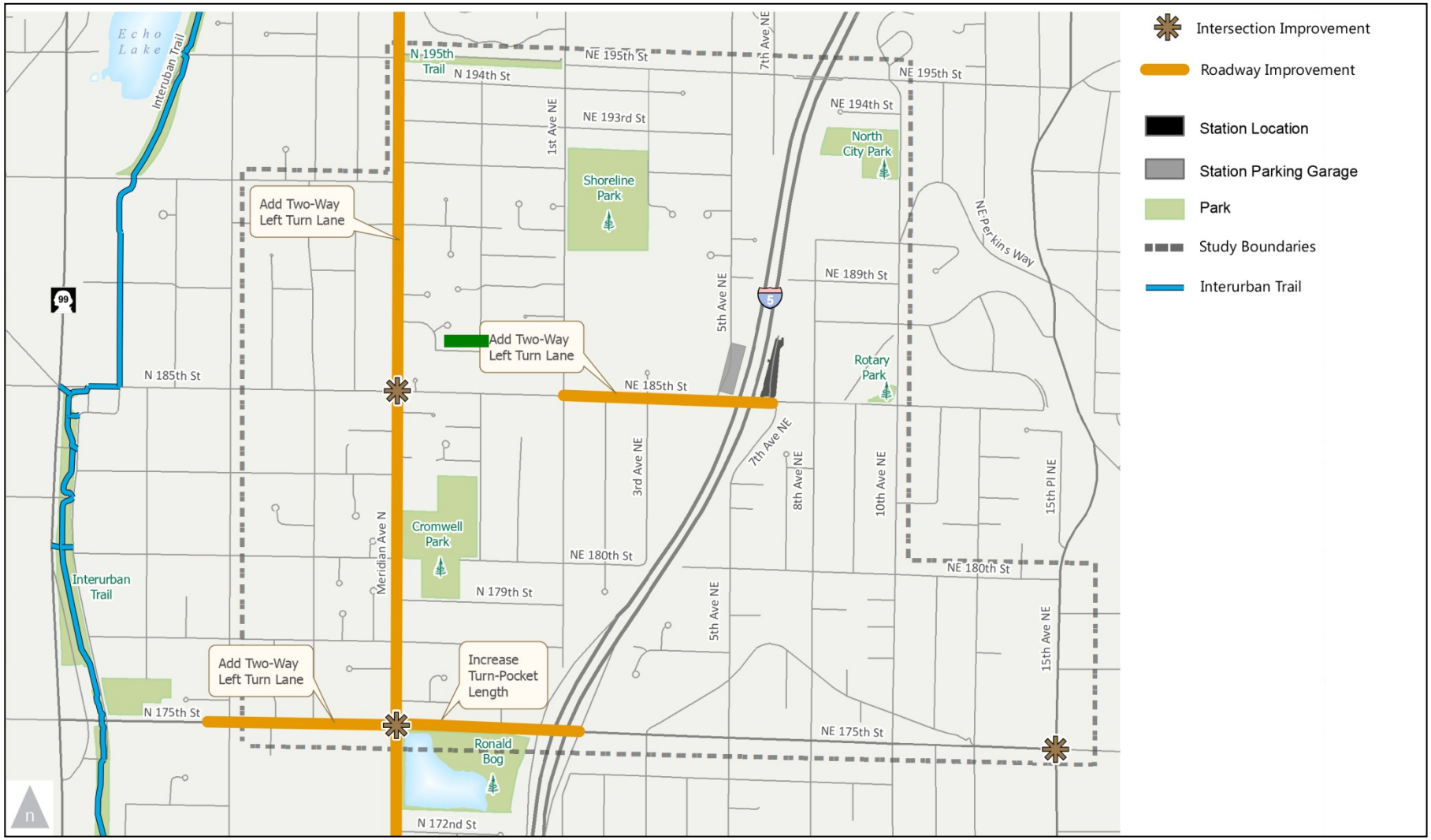


Figure 3.3-9 Roadway Improvements to Accommodate Growth Identified in the Transportation Master Plan



3.3.2 Analysis of Potential Impacts

Introduction

This section describes potential impacts as a result of changes in land use within the subarea. It includes a description of the forecast methodology as well as a detailed account of the results of the transportation impact analysis. The four alternatives evaluated during this process included:

- **Alternative 4—Preferred Alternative**, which envisions an additional 23,554 households and 15,340 jobs total in the subarea, building out in 80 to 125 years or more.
- **Twenty Year/2035,** for which the analysis addresses potential impacts through 2035 and provides recommended mitigation measures/capital improvement projects to support this growth (4,450 to 5,500 households and 1,950 to 2,370 jobs). Given the growth rate applied, the twenty year projection would be the same regardless of which action alternative is implemented.
- **Alternative 3—Previous Most Growth**, which envisions an additional 15,548 households and 27,050 jobs total in the subarea, building out in 60 to 100 years or more.
- **Alternative 2—Some Growth**, which envisions an additional 7,296 households and 9,750 jobs total in the subarea, building out in 30 to 50 years or more.
- **Alternative 1—No Action**, which assumes that there would be minimal growth within the subarea based upon existing zoning designations with the total forecast of 3,639 households and 1,736 by 2035 in the subarea.

Forecasts

Baseline Forecasts

In order to determine the transportation-related impacts of the various land use alternatives, traffic volumes were forecast based on changes in development intensity within the subarea. The 2011 TMP update included forecasts of year 2030 traffic volumes. These forecasts were based on a transit-oriented land use scenario in which much of the city's future housing and employment growth was directed to multiple transit nodes within the city, including the 185th Street Station subarea.

In order to reflect a true "no action" alternative as a baseline for analyzing the potential impacts of the proposed land use changes in the subarea, the travel model was re-run utilizing a "Dispersed" land use scenario, which directed future growth more evenly throughout the city based on existing zoning and observed development patterns. Because the travel model provided forecast traffic volumes for year 2030, the traffic volumes were increased by 0.5 percent to reflect estimated 2035 volumes, in order to be consistent with the land use horizon year. In addition, the future year forecasts were adjusted to account for vehicle trips associated with the Point Wells planned development[8]. Trips forecast in the Point Wells Expanded Traffic Impact Analysis were added on top of the alternatives, including Alternative 4—

[8] The Point Wells planned mixed-use development is a 61 acre site located in an unincorporated portion of Snohomish County adjacent to the northern border of Shoreline and the Puget Sound.

Preferred Alternative, Alternative 3—Previous Most Growth, Alternative 2—Some Growth, and Alternative 1—No Action.

To analyze how the three action alternatives (Alternatives 4, 3 and 2) would result in different travel patterns due to their mix of land uses and connectivity, the project team used an innovative trip generation analysis technique known as the mixed-use development (MXD) model. The MXD model is based on a growing body of research, which focuses on the relationship between travel and the built environment. This method supplements conventional trip generation methods to capture effects related to built environment variables (known as the Ds) like **d**ensity, **d**iversity of land uses, **d**estinations (accessibility), **d**evelopment scale, pedestrian and bicycle **d**esign, **d**istance to transit services, and **d**emographics. ***The model correlates density and high-capacity transit ridership, reinforcing how density can support transit.***

> The MXD analysis is a method for vehicle trip forecasting that more accurately reflects the number of trips that can be completed within a given subarea due to complementary land uses such as residential and retail.

The proposed height and density alternatives in the 185th Street Station Subarea incorporate changes in a number of these variables that, in turn, would influence the neighborhood's travel characteristics. In short, projects with higher densities, a rich variety of land uses close to one another, and high quality pedestrian, bicycle, and transit environments have a lower vehicle trip generation rate. People have more choices in terms of both the travel mode as well as how far they must travel to reach various destinations. The MXD method provides a more reasonable picture of how travel characteristics change over time by avoiding overestimating the number of vehicle trips that infill projects generate.

The MXD method was applied to the station subarea to calculate the number of pedestrian, transit, and automobile trips generated from new development. **Table 3.3-4** highlights the mode split of the PM peak hour trips generated by full development within the subarea. As the table shows, the proposal to increase land use intensity for the Some Growth, Previous Most Growth, and Preferred Alternatives results in a higher proportion of short distance trips that could be made via walking, bicycling, and transit.

To evaluate how streets and intersections in the subarea would operate under the alternatives, traffic volume estimates were developed with the following methodology. For the No Action Alternative, traffic volumes were generated from the "Dispersed" land-use model. The analysis for each of the growth alternatives utilized the No Action traffic volumes plus the additional auto trips related to the land use changes for that alternative. Note that distribution of trips was based on existing travel patterns and expected shifts as a result of regional traffic growth[9].

The MXD method was also applied to the alternatives to evaluate transportation-related greenhouse gas (GHG) emissions associated with each. This GHG calculation considers emissions from motor vehicles only and does not include other emissions related to the built environment. While the Preferred Alternative resulted in more GHG emissions than the No Action Alternative, it should be noted that the No Action Alternative assumed substantially less overall housing and employment.

[9] With adjustments for the extra five years of traffic growth and potential development at Point Wells

To provide a more even comparison amongst the alternatives, a version of the Dispersed land-use model was run with housing and employment growth equivalent to the Preferred Alternative. Under this scenario, the built environment would be similar to the No Action Alternative, which is less conducive to bicycling, walking, and transit and results in more overall vehicle travel.

Similarly, this scenario would generate much higher levels of transportation-related GHG-emissions, as shown in **Table 3.3-4**. In a later section, improvements for the next 20 years are described based on a housing and employment growth rate to 2035. The forecast mode splits, trips generated, and GHG emissions are also identified in **Table 3.3-4**

Table 3.3-4 Percentage of Trips by Mode

Action Alternatives	External Walk/Bike Trips	External Transit Trips	Internal Trips	External Auto Trips	Total PM Peak Trips Generated	External PM Auto Trips Generated	Daily Transportation-Related GHG Emissions
Dispersed Land-Use Model w/ Alt. 4—Preferred Alternative Population and Employment totals	4%	4%	25%	66%	20,111	**13,312**	**640**
Alternative 4—Preferred Alternative	10%	11%	35%	45%	20,111	**8,967**	**320**
First Twenty Years (Up to 2035)	5%	8%	29%	57%	8,289	**4,725**	**169**
Alternative 3—Previous Most Growth	9%	11%	34%	46%	20,370	**9,390**	**308**
Alternative 2—Some Growth	6%	8%	31%	56%	12,310	**6,890**	**211**

Roadway Improvement Assumptions

The TMP planned transportation projects and the projects from the Lynnwood Link DEIS outlined in the previous section were considered in all of the future year scenarios. These improvements included:

- N-NE 185th St: Two-way left-turn lane
- Meridian Ave N: Two-way left-turn lane
- N 185th St / Meridian Ave N: 500 foot northbound and southbound add/drop lanes including a second through lane and receiving lane. 50 foot eastbound right-turn pocket
- Expanded turn pocket lengths for Meridian Ave N and N 175th St intersection
- Intersection improvements at 15th Ave NE and NE 175th St intersection

Alternative 4—Preferred Alternative

Street Access and Circulation

Similar to Alternative 3—Previous Most Growth, changes in redevelopment under the Preferred Alternative would allow for the creation of new internal streets and paths. If redeveloped, the Shoreline Center site could provide additional connections through the site to 3rd Avenue NE or NE 190th Street. Additionally, redevelopment and parcel consolidation in other areas could establish a denser grid of paths for improved pedestrian and bicycle access. However, the area would still be constrained to N-NE 175th Street, N-NE 185th Street, and N-NE 195th Street (pedestrian/bicycle only) as primary connections across I-5.

Collector Arterials (such as 1st Avenue NE, 5th Avenue NE north of 185th Street, NE 180th Street, and Perkins Way) are not subject to the City's concurrency standard. While it is not anticipated that Perkins Way would see substantial traffic resulting from new development within the station area, other Collector Arterials in the subarea may. As future travel patterns change, some of these streets may be candidates for potential traffic calming measures or for reclassification to Minor Arterials.

Traffic Volumes

Under the Preferred Alternative, with full build-out of the proposed zoning, many intersections would fail to meet the City's standard, operating at LOS E or F as shown in **Figure 3.3-10** and **Table 3.3-5**. Intersections along N-NE 185th and N-NE 175th Street would experience a large increase in average vehicle delay due to additional vehicle trips generated by development proposed under this alternative. At this time, it has not been determined how many of these land uses would be accessed directly off of N-NE 185th and N-NE 175th versus from lower classified streets (such as 1st Avenue NE and 5th Avenue NE) or alleyways. Provision of internal circulation routes, which consolidate access, would lessen intersection impacts. The improvements needed to mitigate these impacts are described later in this document.

Average Daily Traffic Volumes on Major Corridors

Similarly, the increase in trips generated within the subarea would result in substantial growth in ADT volumes along roadway corridors as shown in **Table 3.3-6** and **Figure 3.3-11.** Meridian Avenue N, 5th Avenue NE, and N-NE 185th Street would experience the largest percentage change, with growth of between 116 and 260 percent as compared to existing conditions, while the growth along N-NE 175th Street would be between 60 and 72 percent. V/C ratios for many of the major corridors would exceed .90 during the PM peak period.

Vehicle-Miles-Traveled and Greenhouse Gas Emissions

Based on the land use forecasts, the total VMT generated from land uses within the subarea under the Preferred Alternative would amount to roughly 525,000 miles per day. In total, future land use and transportation would generate roughly 320 metric tons of CO_2 per day under the Preferred Alternative. In comparison, Alternative 1--No Action would generate approximately 1,110,000 daily VMT and 640 metric tons of CO_2 per day based on existing land use patterns and the anticipated amount of driving.

Transit Service and Mobility

The growth in vehicle traffic would substantially impact overall transit speed and reliability along N-NE 185th Street, Meridian Avenue N, and N-NE 175th Street if no transit priority treatments are provided. Because of a higher amount of density forecasted in the Preferred Alternative, the area could support more routes and more frequent service. Additional transit service may be provided along 10th Avenue NE and NE 180th Street to support a connection between the Aurora Town Center, the light rail station and the North City area. Expanded frequency of service would be supported by the increase in population and employment density. Any new curbs installed along 10th Avenue NE and NE 180th Street should allow for proper curb radii that can accommodate buses.

Parking Conditions

Within the subarea, peak parking demand is expected to be approximately 39,000 spaces more than Alternative 1—No Action (a total of 45,000), with a higher concentration near retail-uses. This amount is a 16 percent reduction from unadjusted demand due to the potential for shared parking between complementary uses. The current zoning code allows for a reduction of up to 25 percent required spaces if there is a shared parking agreement with adjoining parcels or if high-capacity transit service is available within a one-half-mile walk shed, conditions that future development would meet under the Preferred Alternative. Based on existing and future supply provided by new development at current rates specified in the zoning code, approximately 49,700 spaces would exist within the subarea.

Pedestrian and Bicycle Mobility

Pedestrian and bicycle mobility should improve as new sidewalk and bicycle facilities are installed as capital projects or with new development.

City code stipulates that any multifamily residential uses must have a minimum of one short-term bicycle parking space per ten dwelling units, one long-term bicycle parking space per studio or one-bedroom unit, and two per unit having two or more bedrooms. Commercial development must have one short-term bicycle stall per twelve vehicle parking spaces and one long-term space per 25,000 square feet of commercial floor area.

Consolidation of parcels may allow for non-motorized paths to close current gaps in the roadway network and connect to other on- and off-street facilities. That said, significant increase in traffic volumes in the subarea may increase overall bicycle stress for a number of roadway segments. Bicycle connections from the Interurban Trail may be impacted by increased vehicle traffic along N-NE 185th Street, Meridian Avenue N, and 1st Avenue NE, causing a higher bicycling stress environment; more separated facilities may be required.

The subarea plan calls for creating a vibrant, walkable, transit-oriented neighborhood with safe and efficient pedestrian and bicycle access to and from the light rail station, as shown in this conceptual illustration. A shared use path under the power lines along 8th Avenue NE could be a future option for relieving bike stress.

Table 3.3-5 PM Peak Period Intersection Level of Service for the Full Build-out of Alternative 4—Preferred Alternative

Signal Type	Intersection	Existing LOS	Existing Delay (sec. / veh.)	No Action LOS	No Action Delay (sec. / veh.)	Preferred Alternative LOS	Pref. Alt Delay (sec. / veh.)
Signalized	185th St / Meridian Ave	D	54	D	45	**F**	**>120**
Signalized	185th St / 1st Ave	A	<10	B	14	**F**	**>120**
Unsignalized	185th St / 5th Ave	B	**23**	**F**	**>120**	**F**	**>120**
Unsignalized	185th St / 7th Ave	B	**20**	**E**	**36**	**F**	**>120**
Unsignalized	185th St / 10th Ave	A	11	C	21	**F**	**108**
Signalized	15th Ave / Perkins Way	C	21	D	53	**E**	**59**
Unsignalized	180th St / 10th Ave	A	<10	C	20	**F**	**>120**
Signalized	180th St / 15th Ave	A	<10	C	22	D	38
Signalized	175th St / Meridian Ave	D	51	D	54	**F**	**110**
Signalized	175th St / I-5 SB Ramps	C	**30**	**E**	**79**	**F**	**>120**
Signalized	175th St / I-5 NB Ramps	D	**45**	**F**	**>120**	**F**	**>120**
Signalized	175th St / 5th Ave	C	25	C	26	D	34
Signalized	175th St / 10th Ave	A	<10	B	16	D	48
Signalized	175th St / 15th Ave	D	47	D	53	**E**	**69**

Note: bold numbers signify intersections that would fall below the City's LOS standard.

Figure 3.3-10 Intersection Level of Service
for the Full Build-out of Alternative 4—Preferred Alternative

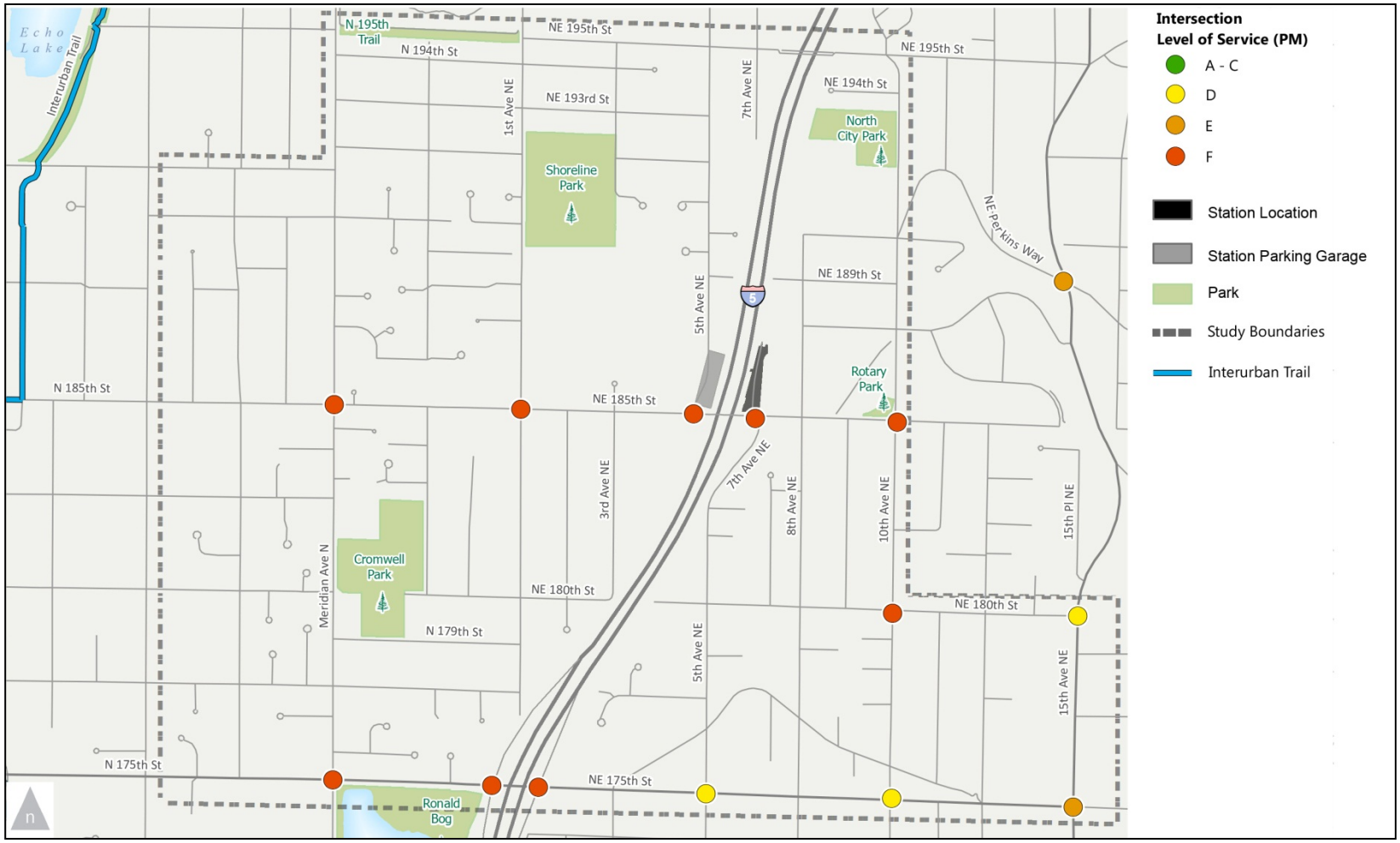
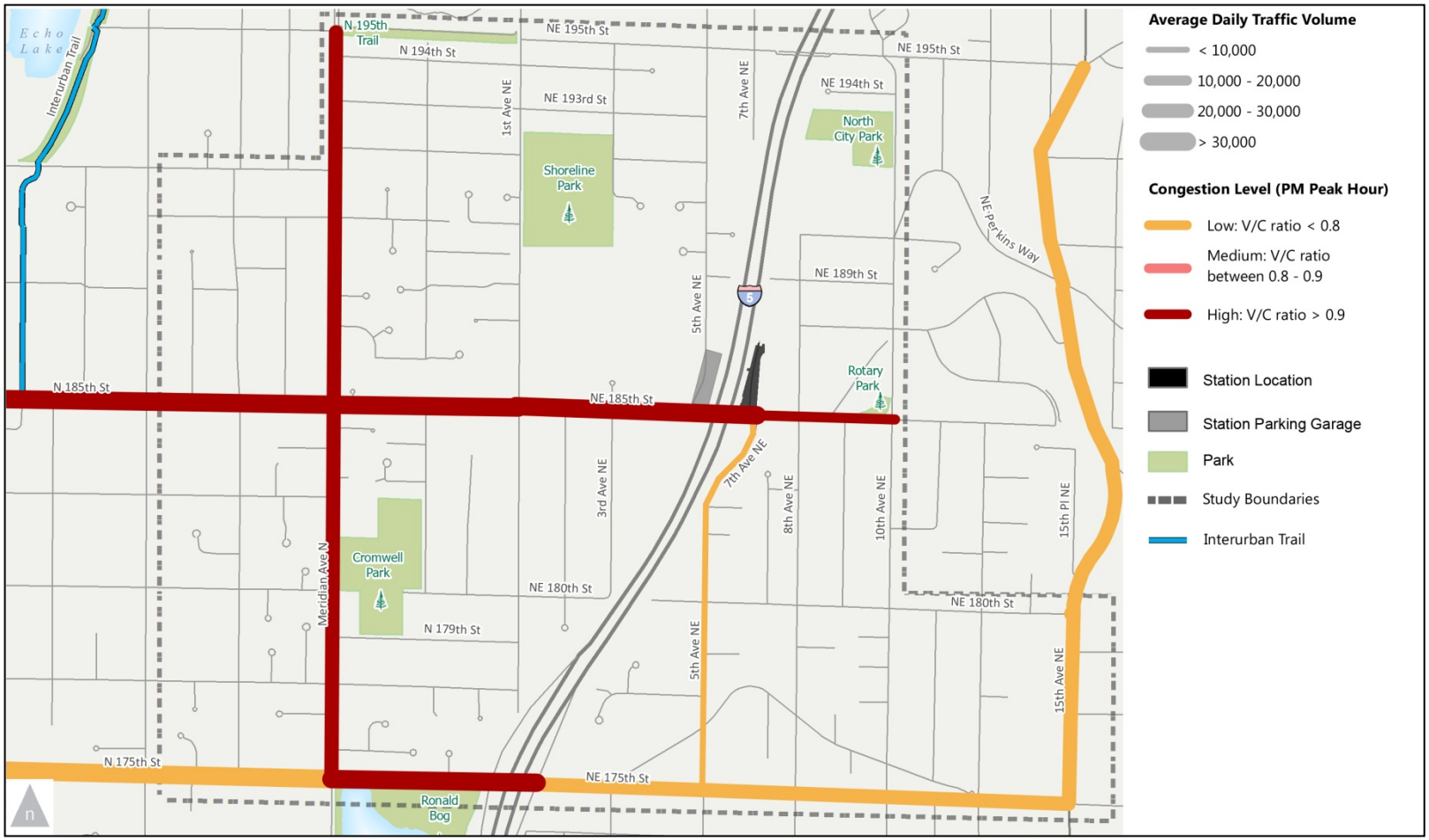


Table 3.3-6 Average Daily Traffic Volumes and PM Peak Period Congestion for the Full Build-out of Alternative 4—Preferred Alternative

Street	Segment	Existing ADT	No Action ADT	Preferred Alt. ADT	Pref. Alt. PM Peak Hour Volume[10]	Preferred Alt. V/C
East-West Corridors						
175th Street	West of I-5	30,770	39,490	52,820	2,115	**>1.0**
175th Street	East of I-5	18,010	21,180	28,590	1,186	0.76
185th Street	West of I-5	9,700	17,180	34,620	1,831	**>1.0**
185th Street	East of I-5	7,130	11,360	17,080	937	**.94**
North-South Corridors						
5th Avenue NE	South of N 185th Street	3,360	5,700	8,770	399	0.57
15th Avenue NE	North of N 175th Street	15,040	20,340	21,610	1,470	0.79
Meridian Avenue N	North of N 175th Street	12,070	15,140	26,100	1,602	**>1.0**

[10] One-directional volume only, signifying the direction with the highest volume

Figure 3.3-11 Average Daily Traffic and PM Peak Congestion for the Full Build-out of Alternative 4—Preferred Alternative



The First Twenty Years (Up to 2035) for Any Action Alternative

Introduction

While the impacts and mitigation measures specified for the Preferred Alternative would occur over the projected 80 to 125 year timespan, this section describes the mitigation measures that would be needed to address impacts in the near-term, specifically over a twenty-year horizon. Given the growth rate applied, the twenty-year projection would be the same for all action alternatives.

Growth Forecast

Based on a 1.5 to 2.5 percent growth rate over the next 20 years, a total of 1,950 to 2,370 employees and 4,450 to 5,500 households would be located within the subarea. The assumed growth rates are based on historical trends in the region and may fluctuate around the average of 1.5 and 2.5 percent annually depending on actual market conditions. Additionally, while the analysis assumed an equal distribution of development throughout the subarea, particular parcels may redevelop at a higher or lower rate than the average. Actual distribution of development would impact where and when specific roadways and areas experience a change in travel patterns.

Average Daily Traffic and Intersection Level of Service

As shown in **Figure 3.3-12** and in **Figure 3.3-13**, additional trips resulting from redevelopment as part of the Preferred Alternative in the subarea would increase average vehicle delay at intersections and along roadways. However, many intersections would still operate at or better than LOS D during the PM peak period. Congestion along N-NE 185th Street would be influenced by actual development patterns and the access routes to the new development. Intersections directly adjacent to the station and the parking garage would most likely require signalization as a result of trips generated specifically for station access, however no added lane capacity would be required at those intersections. While impacts from light rail implementation are addressed in the Lynnwood Link Extension DEIS, the following section identifies specific steps the City may take to address any potential impacts within the subarea.

Figure 3.3-12 Average Daily Traffic and PM Peak Congestion for the First Twenty Years (up to 2035)

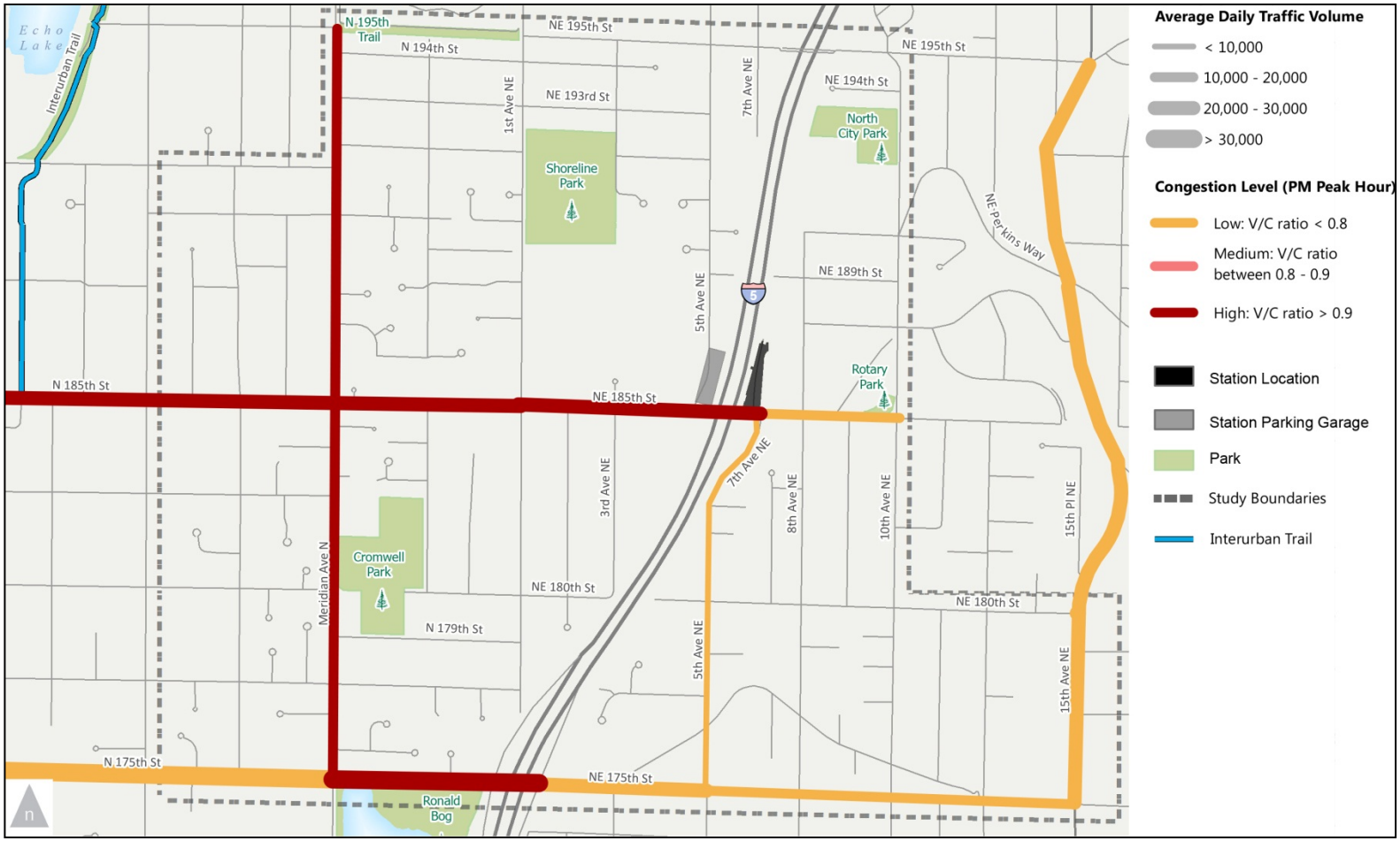
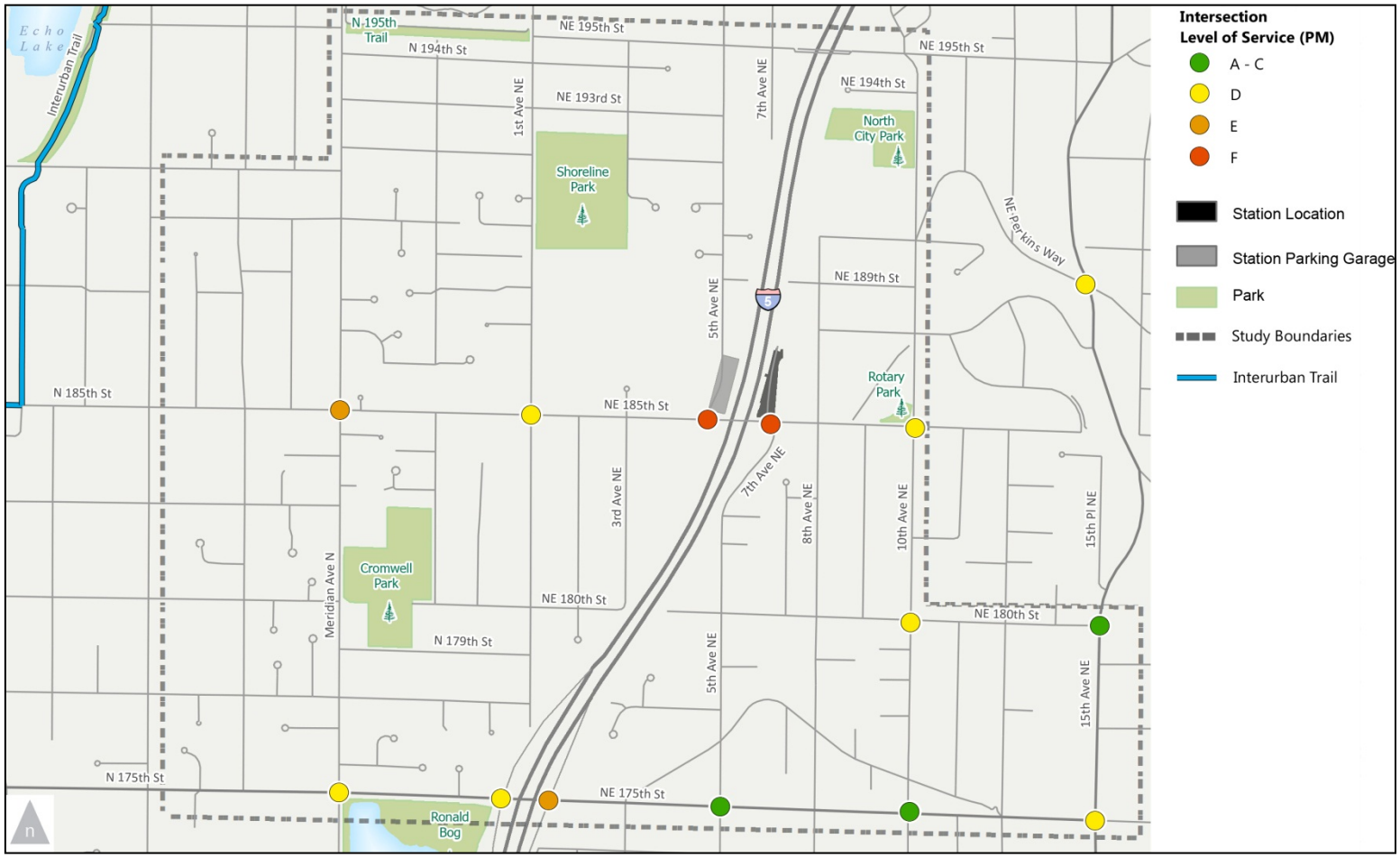


Figure 3.3-13 Intersection Level of Service for the First Twenty Years (up to 2035)



Alternative 3—Previous Most Growth

Street Access and Circulation

Changes in redevelopment under Alternative 3—Previous Most Growth would allow for the creation of new internal streets and paths. The Shoreline Center site could provide additional connections through the site to 3rd Avenue NE or NE 190th Street. Additionally, redevelopment and parcel consolidation in other areas could establish a denser grid of paths for improved pedestrian access. However, the area would still be constrained to N-NE 175th Street, N-NE 185th Street, and N-NE 195th Street (pedestrian/bicycle only) as primary connections across I-5.

Collector Arterials (such as 1st Avenue NE, 5th Avenue NE north of 185th Street, NE 180th Street, and Perkins Way) are not subject to the City's concurrency standard. While it is not anticipated that Perkins Way would see substantial traffic resulting from new development within the station area, other Collector Arterials in the subarea may. As future travel patterns change, some of these streets may be candidates for potential traffic calming measures or for reclassification to Minor Arterials.

Traffic Volumes

Under Alternative 3—Previous Previous Most Growth, with full build-out of the proposed zoning, many intersections would fail to meet the City's standard, operating at LOS E or F as shown in **Figure 3.3-14** and **Table 3.3-7**. Intersections along N-NE 185th and N-NE 175th Street would experience a large increase in average vehicle delay due to additional vehicle trips generated by development proposed under this alternative. At this time, it has not been determined how many of these land uses would be accessed directly off of N-NE 185th and N-NE 175th or from lower classified streets (such as 1st Avenue NE and 5th Avenue NE) or alleyways. Provision of internal circulation routes, which consolidate access, would lessen intersection impacts. The improvements needed to mitigate these impacts are described later in this document.

Average Daily Traffic Volumes on Major Corridors

Similarly, the increase in trips generated within the subarea would result in substantial growth in ADT volumes along roadway corridors as shown in **Table 3.3-8** and **Figure 3.3-15**. Meridian Avenue N, 5th Avenue NE, and N-NE 185th Street would experience the largest percentage change, with growth of between 100 and 250 percent as compared to existing conditions, while the growth along N-NE 175th Street would be roughly 60 percent. V/C ratios for many of the major corridors would exceed .90 during the PM peak period.

Vehicle-Miles-Traveled and Greenhouse Gas Emissions

Based on the land use forecasts, the total VMT generated from land uses within the subarea under Alternative 3—Previous Most Growth would amount to roughly 502,000 miles per day. In total, future land use and transportation would generate roughly 308 metric tons of CO_2 per day under Alternative 3—Previous Most Growth. In comparison, Alternative 1--No Action would generate approximately 1,160,000 daily VMT and 630 metric tons of CO_2 per day based on existing land use patterns and the anticipated amount of driving.

Transit Service and Mobility

The growth in vehicle traffic would substantially impact overall transit speed and reliability along N-NE 185th Street, Meridian Avenue N, and N-NE 175th Street if no transit priority treatments are provided. Because of a higher amount of density forecast in Alternative 3—Previous Most Growth, the area could support more routes and more frequent service. Additional transit service may be provided along 10th Avenue NE and NE 180th Street to provide connection between the Aurora Town Center, the light rail station, and North City. Expanded frequency of service would be supported by the increase in population and employment density. Any new curbs installed along 10th Avenue NE and NE 180th Street should allow for proper curb radii that can accommodate buses.

Parking Conditions

Within the subarea, peak parking demand is expected to be approximately 35,000 spaces more than Alternative 1—No Action (a total of 41,000), with a higher concentration near retail-uses. This amount is a 16 percent reduction from unadjusted demand due to the potential for shared parking between complementary uses. The current zoning code allows for a reduction of up to 25 percent required spaces if there is a shared parking agreement with adjoining parcels or if high-capacity transit service is available within a one-half-mileradius, conditions that future development would meet under Alternative 3—Previous Most Growth. Based on existing and future supply provided by new development at current rates specified in the zoning code, approximately 48,000 spaces would exist within the subarea.

Pedestrian and Bicycle Mobility

Pedestrian and bicycle mobility should improve as new sidewalk and bicycle facilities are installed as capital projects or with new development.

City code stipulates that any multifamily residential uses must have a minimum of one short-term bicycle parking space per ten dwelling units, one long-term bicycle parking space per studio or one-bedroom unit, and two per unit having two or more bedrooms. Commercial development must have one short-term bicycle stall per twelve vehicle parking spaces and one long-term space per 25,000 square feet of commercial floor area.

Consolidation of parcels may allow for pedestrian-only paths to close current gaps in the roadway network. That said, significant increase in traffic volumes in the subarea may increase overall bicycle stress for a number of roadway segments. Bicycle connections from the Interurban Trail may be impacted by increased vehicle traffic along N-NE 185th Street, Meridian Avenue N, and 1st Avenue NE, causing a higher bicycling stress environment; more separated facilities may be required.

Table 3.3-7 PM Peak Period Intersection Level of Service for Alternative 3—Previous Most Growth

Signal Type	Intersection	Existing LOS	Existing Delay (sec. / veh.)	No Action LOS	No Action Delay (sec. / veh.)	Previous Most Growth LOS	Previous Most Growth Delay (sec. / veh.)
Signalized	185th St / Meridian Ave	D	54	D	45	**F**	**>120**
Signalized	185th St / 1st Ave	A	<10	B	14	**F**	**>120**
Unsignalized	185th St / 5th Ave	B	**23**	**F**	**>120**	**F**	**>120**
Unsignalized	185th St / 7th Ave	B	**20**	**E**	**36**	**F**	**>120**
Unsignalized	185th St / 10th Ave	A	11	C	21	**F**	**90**
Signalized	15th Ave / Perkins Way	C	21	D	53	**E**	**60**
Unsignalized	180th St / 10th Ave	A	<10	C	20	**F**	**>120**
Signalized	180th St / 15th Ave	A	<10	C	22	D	43
Signalized	175th St / Meridian Ave	D	51	D	54	**F**	**87**
Signalized	175th St / I-5 SB Ramps	C	**30**	**E**	**79**	**F**	**100**
Signalized	175th St / I-5 NB Ramps	D	**45**	**F**	**>120**	**F**	**>120**
Signalized	175th St / 5th Ave	C	25	C	26	D	37
Signalized	175th St / 10th Ave	A	<10	B	16	C	31
Signalized	175th St / 15th Ave	D	47	D	53	**E**	**72**

Note: bold numbers signify intersections that would fall below the City's LOS standard.

Figure 3.3-10 Intersection Level of Service for Alternative 3—Previous Most Growth

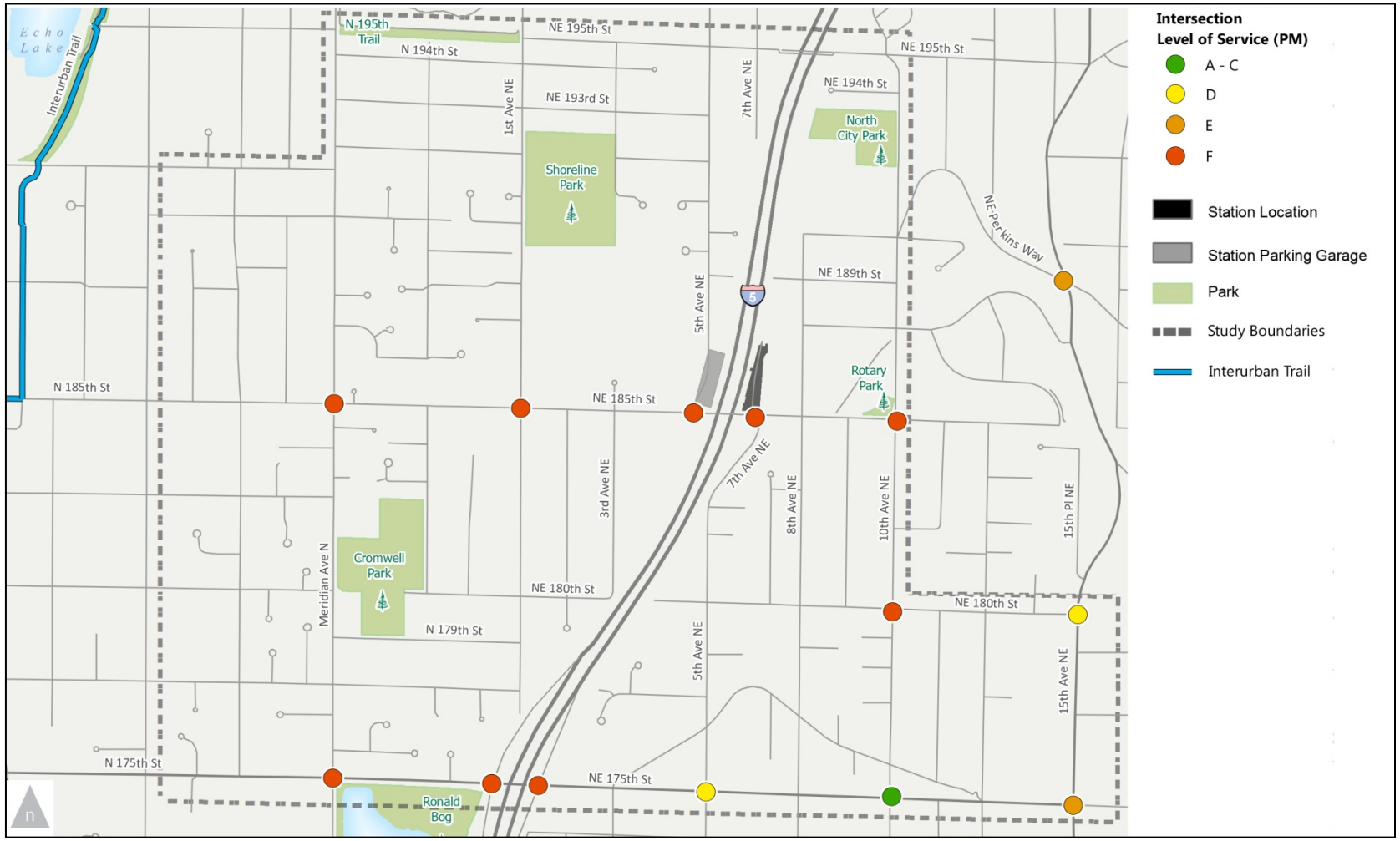
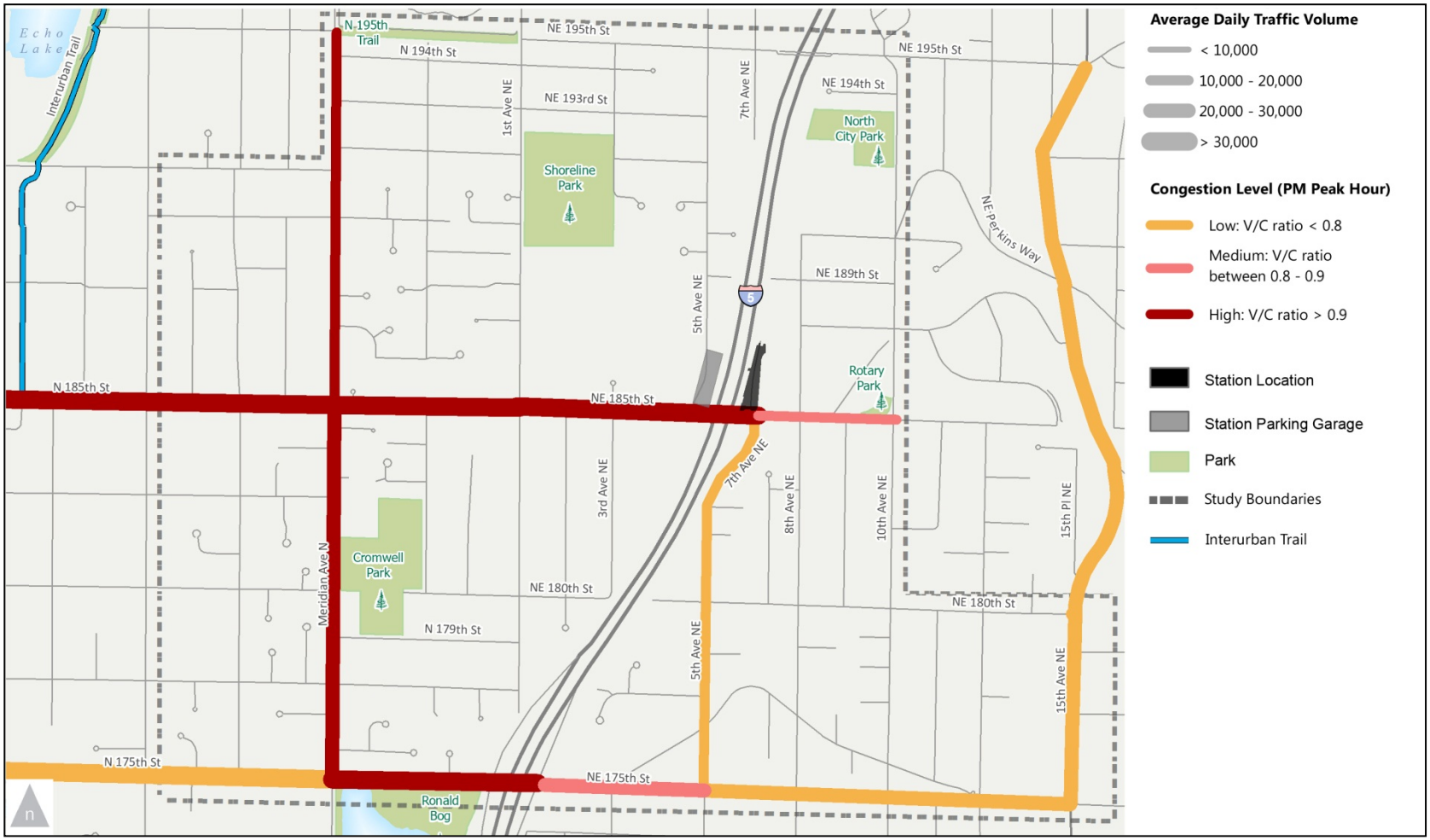


Table 3.3-8 Average Daily Traffic Volumes and PM Peak Period Congestion for Alternative 3—Previous Most Growth

Street	Segment	Existing ADT	No Action ADT	Previous Most Growth ADT	Previous Most Growth PM Peak Hour Volume[11]	Previous Most Growth V/C
East-West Corridors						
175th Street	West of I-5	30,770	39,490	49,340	1,871	**>1.0**
175th Street	East of I-5	18,010	21,180	28,440	1,275	0.82
185th Street	West of I-5	9,700	17,180	34,030	1,748	**>1.0**
185th Street	East of I-5	7,130	11,360	16,240	890	**.90**
North-South Corridors						
5th Avenue NE	South of N 185th Street	3,360	5,700	10,070	532	0.76
15th Avenue NE	North of N 175th Street	15,040	20,340	21,950	1,481	0.78
Meridian Avenue N	North of N 175th Street	12,070	15,140	23,800	1,377	**>1.0**

[11] One-directional volume only, signifying the direction with the highest volume

Figure 3.3-11 Average Daily Traffic and PM Peak Congestion
Alternative 3—Previous Most Growth



Alternative 2—Some Growth

Street Access and Circulation

Changes in land use zoning, parcel consolidation and redevelopment would allow for the creation of new streets and paths along with the consolidation of access points to N-NE 185th Street. While the Shoreline Center site could provide additional alley or side street connections through the site to 3rd Avenue NE or NE 190th Street, the area would still be constrained by I-5, with east-west connections limited to N-NE 175th Street, N-NE 185th Street, and N-NE 195th Street (pedestrian/bicycle only).

Collector Arterials (such as 1st Avenue NE, 5th Avenue NE north of 185th Street, NE 180th Street, and Perkins Way) are not subject to the City's concurrency standard. While it is not anticipated that Perkins Way would see substantial traffic resulting from new development within the station area, other Collector Arterials in the subarea may. As future travel patterns change, some of these streets may be candidates for potential traffic calming measures or for reclassification to Minor Arterials.

Traffic Volumes

Under Alternative 2—Some Growth, with full build-out of the proposed zoning, many intersections would fail to meet the City's standard, operating at LOS E or F as shown in **Figure 3.3-16** and **Table 3.3-9**. Intersections along N-NE 185th and N-NE 175th Street would experience a large increase in average vehicle delay due to additional vehicle trips generated by development proposed under Alternative 2—Some Growth. At this time, it has not been determined how many of these land uses would be accessed directly off of N-NE 185th and N-NE 175th versus from minor streets (such as 1st Avenue NE and 5th Avenue NE) or alleyways. Provision of internal circulation routes, which consolidate access, would potentially lessen intersection and roadway impacts. The improvements needed to mitigate these impacts are described later in this document.

Average Daily Traffic Volumes on Major Corridors

Similarly, the increase in trips generated within the subarea would result in substantial growth in ADT volumes along roadway corridors as shown in **Table 3.3-10** and **Figure 3.3-17**. Meridian Avenue N, 5th Avenue NE, and N-NE 185th Street would experience the largest percentage change, with growth of between 75 and 160 percent as compared to existing conditions, while the growth along N 175th Street would be between 30 and 50 percent. V/C ratios for many of the major corridors would exceed .90 during the PM peak period.

Vehicle-Miles-Traveled and Greenhouse Gas Emissions

Based on the land use forecasts, the total VMT generated from land uses within the subarea under Alternative 2—Some Growth would amount to roughly 340,000 miles per day. In total, future land use would generate roughly 211 metric tons of CO_2 per day. In comparison, Alternative 1--No Action would generate approximately 1,110,000 daily VMT and 640 metric tons of CO_2 per day based on existing land use patterns and the anticipated amount of driving.

Transit Service and Mobility

The higher density provided under Alternative 2—Some Growth would support more robust public transit service within the subarea. The TMP recommends that frequency of service could be improved to enable more frequent connections to the proposed light rail station. Based on the location of development forecast under Alternative 2—Some Growth, new service along 10th Avenue NE or 1st Avenue NE may be needed to accommodate demand generated from increased development. The growth in vehicle traffic could impact overall transit speed and reliability along N-NE 185th Street, Meridian Avenue N, and N-NE 175th Street if no transit priority treatments are provided.

Parking Conditions

For Alternative 2—Some Growth, peak parking demand is expected to be approximately 13,000 spaces more than Alternative 1—No Action (a total of 18,500) in the subarea with a higher concentration near retail-uses. This amount is a 13 percent reduction from unadjusted demand due to the potential for shared parking between complementary uses. The current zoning code allows for a reduction of up to 25 percent required spaces if there is a shared parking agreement with adjoining parcels or if high-capacity transit service is available within a one-half-mile walk shed, conditions that future development would meet under Alternative 2—Some Growth. Based on existing and future supply provided by new development at current rates specified in the zoning code, approximately 21,000 spaces would exist within the subarea.

Pedestrian and Bicycle Mobility

Pedestrian and bicycle mobility should improve as new sidewalk and bicycle facilities are installed with new development. City code stipulates that any multifamily residential uses must have a minimum of one short-term bicycle parking space per ten dwelling units, and one long-term bicycle parking space per studio or one-bedroom unit, and two per unit having two or more bedrooms. Commercial development must have one short-term bicycle stall per twelve vehicle parking spaces and one long-term space per 25,000 square feet of commercial floor area.

Conditions for development could be structured to allow for the creation of non-motorized paths within larger parcels to connect with other on- and off-street pedestrian and bicycle facilities. Similar to Alternative 1—No Action, the increase in vehicle traffic along N-NE 185th Street and Meridian Avenue N over time will impact bicycle stress along these streets; more separated facilities may be required.

Table 3.3-9 PM Peak Period Intersection Level of Service for Alternative 2—Some Growth

Signal Type	Intersection	Existing LOS	Existing Delay (sec. / veh.)	No Action LOS	No Action Delay (sec. / veh.)	Previous Most Growth LOS	Previous Most Growth Delay (sec. / veh.)
Signalized	**185th St / Meridian Ave**	D	54	D	45	**F**	**>120**
Signalized	**185th St / 1st Ave**	A	<10	B	14	**E**	**76**
Unsignalized	**185th St / 5th Ave**	B	23	**F**	**>120**	**F**	**>120**
Unsignalized	**185th St / 7th Ave**	B	20	**E**	**36**	**F**	**>120**
Unsignalized	**185th St / 10th Ave**	A	11	C	21	**E**	**49**
Signalized	**15th Ave / Perkins Way**	C	21	D	53	D	39
Unsignalized	**180th St / 10th Ave**	A	<10	C	20	**F**	**56**
Signalized	**180th St / 15th Ave**	A	<10	C	22	C	29
Signalized	**175th St / Meridian Ave**	D	51	D	54	**E**	**67**
Signalized	**175th St / I-5 SB Ramps**	C	30	**E**	**79**	**E**	**111**
Signalized	**175th St / I-5 NB Ramps**	D	45	**F**	**>120**	**F**	**>120**
Signalized	**175th St / 5th Ave**	C	25	C	26	C	29
Signalized	**175th St / 10th Ave**	A	<10	B	16	C	23
Signalized	**175th St / 15th Ave**	D	47	D	53	D	55

Note: bold numbers signify intersections that would fall below the City's LOS standard.

Figure 3.3-16 Intersection Level of Service (Alternative 2—Some Growth)

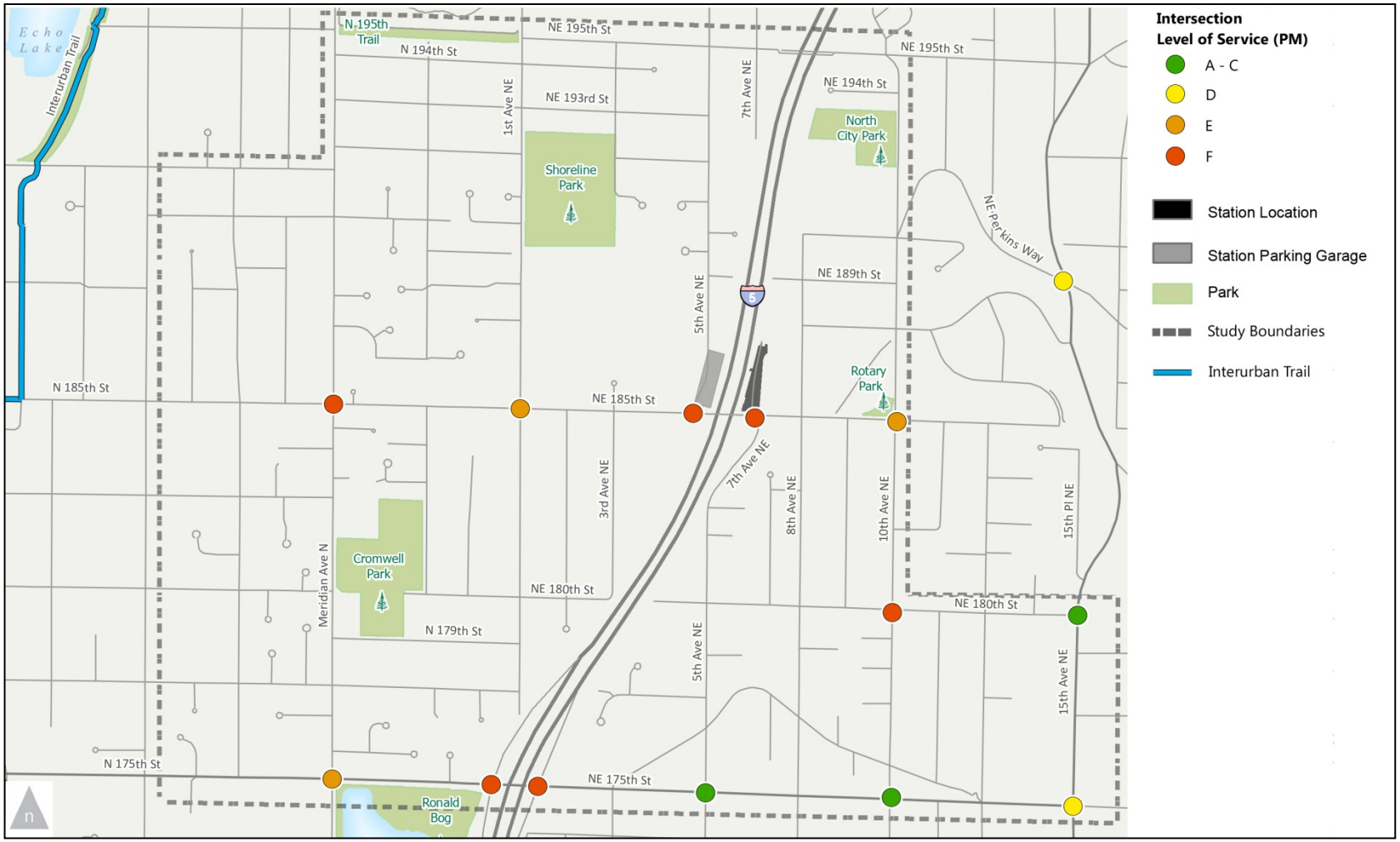
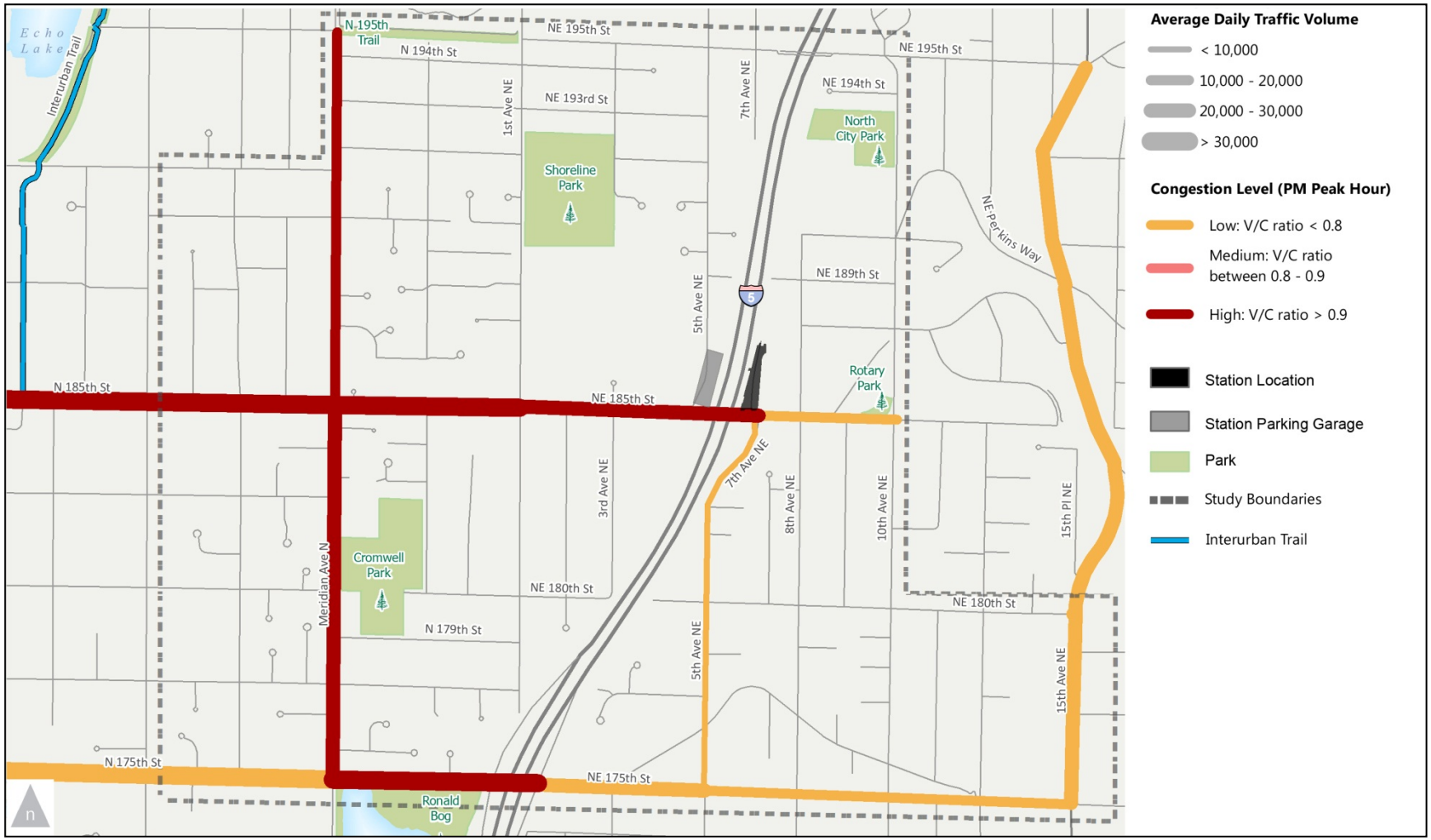


Table 3.3-10 Average Daily Traffic Volumes and PM Peak Period Congestion for Alternative 2—Some Growth

Street	Segment	Existing ADT	No Action ADT	Some Growth ADT	Some Growth PM Peak Hour Volume[12]	Some Growth V/C
East-West Corridors						
175th Street	West of I-5	30,770	39,490	46,850	1,842	**>1.0**
175th Street	East of I-5	18,010	21,180	23,970	1,009	0.65
185th Street	West of I-5	9,700	17,180	24,800	1,241	**>1.0**
185th Street	East of I-5	7,130	11,360	13,700	719	0.74
North-South Corridors						
5th Avenue NE	South of N 185th Street	3,360	5,700	6,380	292	0.40
15th Avenue NE	North of N 175th Street	15,040	20,340	20,990	1,435	0.75
Meridian Avenue N	North of N 175th Street	12,070	15,140	21,270	1,302	**>1.0**

[12] One-directional volume only, signifying the direction with the highest volume

Figure 3.3-12 Average Daily Traffic and PM Peak Congestion for Alternative 2—Some Growth



Alternative 1—No Action

Street Access and Circulation

With no change in land use zoning, the current street access and circulation network would remain for Alternative 1—No Action.

Traffic Impact Analysis

Under Alternative 1—No Action, some signalized intersections would fail to meet the City's LOS standard. These intersections are shown in **Figure 3.3-18** and **Table 3.3-11**. The intersections along N 175th Street would experience the greatest increase in delay as a result of growth in overall traffic volumes. Delays at the intersection of 7th Avenue NE and NE 185th Street, 5th Avenue NE, and NE 185th Street are also expected to exceed the City's standard due to their configuration (side-street stop control) and demands from the northbound left-turn movement from 7th Avenue NE, and the southbound left-turn movement from 5th Avenue NE. Those intersections may require signalization depending on actual traffic volumes once the station is in place.

Average Daily Traffic Volumes on Major Corridors

As shown in **Table 3.3-12**, average daily traffic volumes and congestion under Alternative 1—No Action are expected to grow along major roadway segments compared to today. **Figure 3.3-19** shows expected traffic volumes on roadways and the projected V/C ratios on principal and minor arterials within the subarea. The segment of Meridian Avenue N between N 175th Street and N 185th Street would operate at a V/C ratio of .94, while N-NE 175th Street between I-5 and Meridian Avenue N would have a V/C ratio of .97. Both of these segments would have congestion levels above the City's adopted threshold of .90.

Vehicle-Miles-Traveled and Greenhouse Gas Emissions

Based on the land use forecasts, the total vehicle-miles-traveled (VMT) generated from development within the subarea would amount to roughly 170,000 miles per day. This is based on a continuation of existing land-use patterns and current zoning. The suburban nature of development constrains the amount of trips that can be completed via non-auto modes such as walking, bicycling, or transit because of the long distances between origins and destinations. In total, future land uses within the subarea would generate roughly 150 metric tons of carbon dioxide (CO_2) per day from additional transportation demand. In comparison, a similar amount of housing and retail with a density proposed in the Some Growth Alternative would generate approximately 35,000 fewer daily VMT and 100 fewer metric tons of CO_2 per day.

Transit Service and Mobility

Under the Alternative 1—No Action, transit service would likely remain at current levels, as the existing land uses and densities would not support increases in transit service frequency. While the future light rail station would provide regional mobility, local bus service would primarily function to transport passengers to and from outside of the station subarea. The increased traffic along N 185th Street and Meridian Avenue N may have an impact on overall transit reliability without any mitigating measures, such as transit signal priority or other intersection treatments.

Parking Conditions

Based on current supply and the expected limited growth in demand in the subarea, parking conditions would remain similar to existing conditions. Peak demand is forecast to be

approximately 6,000 spaces for the entire area. The parking minimums articulated in City code specify that any new development of single-family residential uses would be built with two spaces per unit. Any new development in retail or other commercial-related land use would require one space per 300 to 400 feet of leasable space. With little opportunity for development of complementary uses, the amount of parking that could be shared would be limited.

Pedestrian and Bicycle Mobility

Under the Alternative 1—No Action, the pedestrian and bicycle environment would improve with the planned improvements specified in the TMP.

Bicyclists traveling from the Interurban Trail could utilize low stress routes via 1st Avenue NE and 5th Avenue NE in order to connect to the station. However, increased traffic volumes along N-NE 185th Street may justify a more separated facility such as a cycle track. Additionally, with higher traffic volumes projected along Perkins Way, NE 180th Street, and 10th Avenue NE, the bicycling stress may increase without facilities that accommodate bicycles.

Table 3.3-11 PM Peak Period Intersection Level of Service for Alternative 1—No Action

Signal Type	Intersection	Existing LOS	Existing Delay (sec. / veh.)	No Action LOS	No Action Delay (sec. / veh.)
Signalized	185th St / Meridian Ave	D	54	D	45
Signalized	185th St / 1st Ave	A	<10	B	14
Unsignalized	185th St / 5th Ave	B	**23**	**F**	**>120**
Unsignalized	185th St / 7th Ave	B	**20**	**E**	**36**
Unsignalized	185th St / 10th Ave	A	11	C	21
Signalized	15th Ave / Perkins Way	C	21	D	53
Unsignalized	180th St / 10th Ave	A	<10	C	20
Signalized	180th St / 15th Ave	A	<10	C	22
Signalized	175th St / Meridian Ave	D	51	D	54
Signalized	175th St / I-5 SB Ramps	C	**30**	**E**	**79**
Signalized	175th St / I-5 NB Ramps	D	**45**	**F**	**>120**
Signalized	175th St / 5th Ave	C	25	C	26
Signalized	175th St / 10th Ave	A	<10	B	16
Signalized	175th St / 15th Ave	D	47	D	53

Note: bold numbers signify intersections that would fall below the City's LOS standard.

Figure 3.3-13 Intersection Level of Service for Alternative 1—No Action

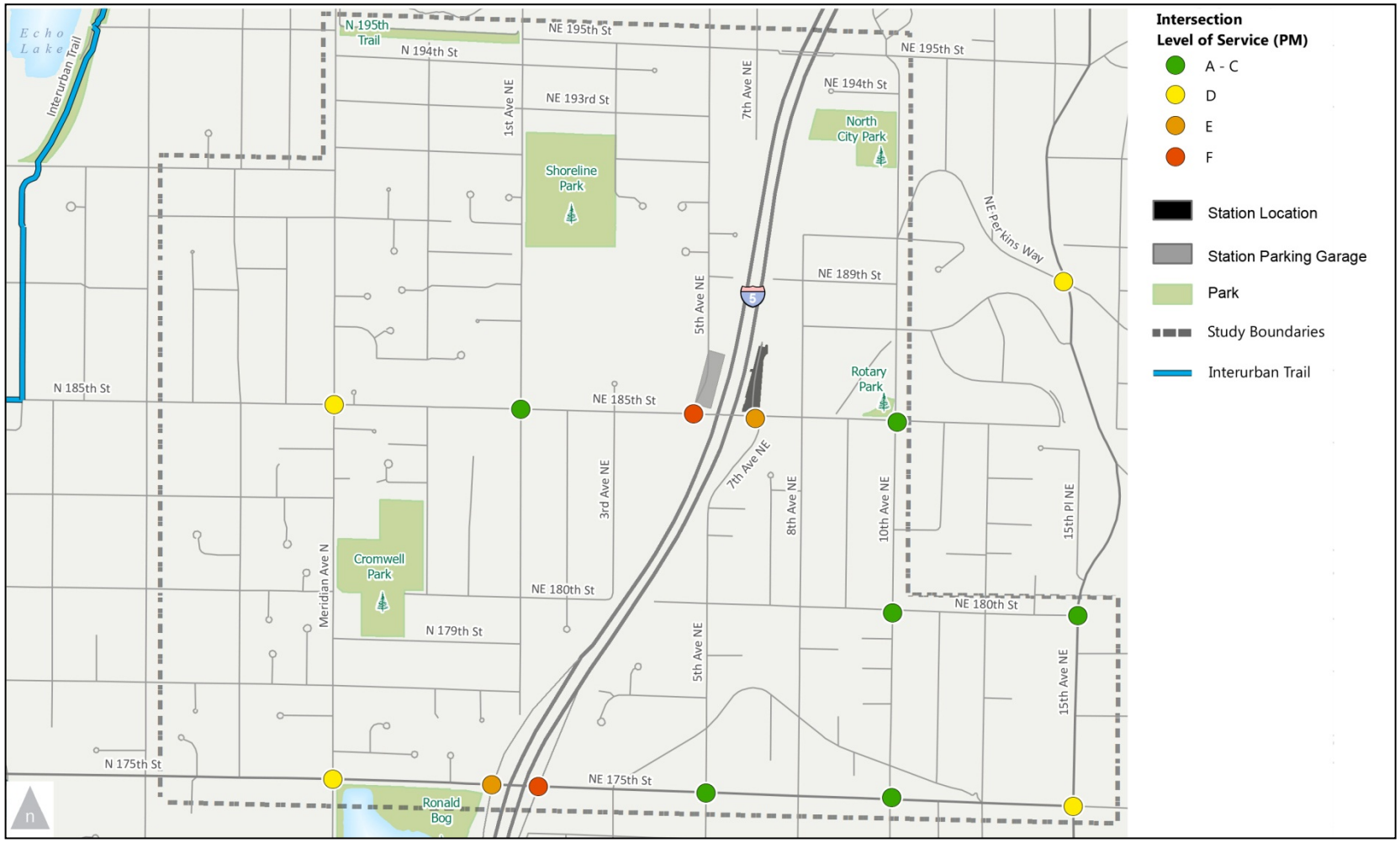
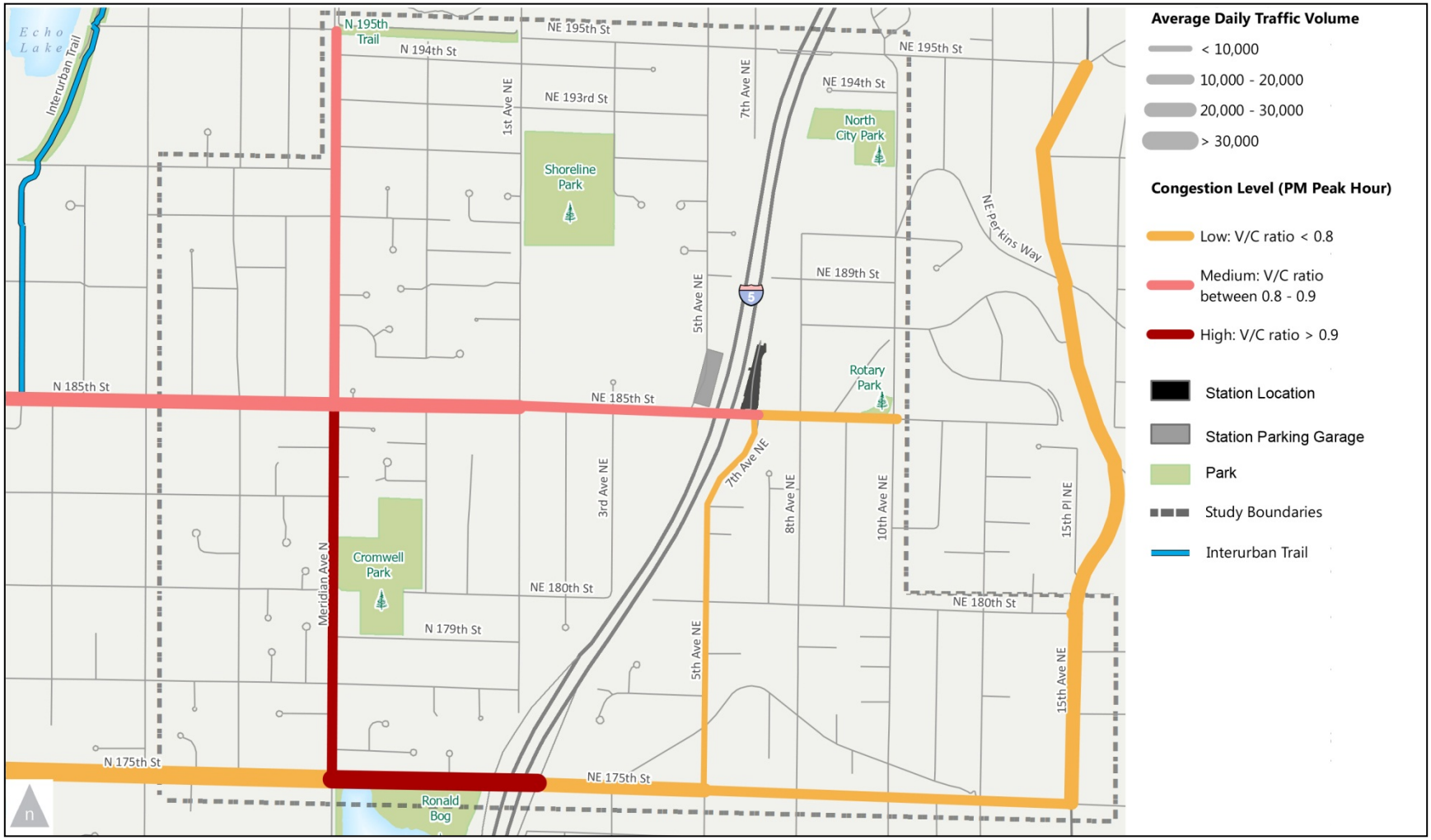


Table 3.3-12 Average Daily Traffic Volumes and PM Peak Period Congestion for Alternative 1—No Action

Street	Segment	Existing ADT	No Action 2035 ADT	No Action PM Peak Hour Volume[13]	No Action V/C Ratio
East-West Corridors					
175th Street	West of I-5	30,770	39,490	1,515	**0.97**
175th Street	East of I-5	18,010	21,180	922	0.59
185th Street	West of I-5	9,700	17,180	896	0.89
185th Street	East of I-5	7,130	11,360	646	0.65
North-South Corridors					
5th Avenue NE	South of NE 185th Street	3,360	5,700	244	0.35
15th Avenue NE	North of NE 175th Street	15,040	20,340	1,403	0.76
Meridian Avenue N	North of N 175th Street	12,070	15,140	920	**0.94**

[13] One-directional volume only, signifying the direction with the highest volume

Figure 3.3-19 Average Daily Traffic and PM Peak Congestion for Alternative 1—No Action



3.3.3 Mitigation Measures

Introduction

This section describes the mitigation measures that would be needed to address impacts under each of the future alternatives. It is important to note that the land use changes proposed and the traffic impacts identified in the previous section are based upon full build-out scenarios for each alternative. While this build-out would occur over a long period of time and would not be fully implemented for any of the alternatives by 2035, the mitigation measures proposed below identify the full scale of actions needed. In reality, these measures would gradually be incorporated as development occurs and would be continually monitored to address the most current conditions. A later section will highlight the near-term projects needed based on a 2035 scenario for any of the action alternatives.

Applicable Regulations and Commitments

The Shoreline Municipal Code (SMC) contains a number of regulations and stipulations that would apply to all future alternatives. Under Chapter 14.10, the City of Shoreline currently manages a Commute Trip Reduction program that assists employers of a certain size to reduce their overall VMT and automobile trips.

This program should continue with new employers in the area to leverage the availability of high capacity transit and reduce the net increase in automobile trips.

Additionally, Chapter 20.50 in the Shoreline Municipal Code contains a number of stipulations for new development that aim to improve pedestrian and bicycle facilities while also reducing the amount of parking provided.

In July 2014, the City Council adopted Shoreline's first Transportation Impact Fees (TIFs). TIFs are charged during the building permitting process and used to fund projects to maintain or improve levels of service on Shoreline's streets. The intent is to share the financial responsibility of providing transportation facilities, such as roads and intersections that support future growth with the development that grows the city's population and economy.

As of January 1, 2015, all projects that add trips to City streets are required to pay the impact fee. This includes accessory dwelling units (ADUs or Mother in Law apartments) or any project that creates space for extra 'trip' generating residents or uses on a property. The fee is proportionate to the size of the development or change in use. There are a number of exemptions, including for affordable housing.

Mitigation Measures for Street and Intersection Impacts

With full build-out, the level of planned development would be substantial under Alternative 4—Preferred Alternative and Alternative 3—Previous Most Growth, and while less substantial under Alternative 2—Some Growth, implementation of any of the action alternatives would require substantial multimodal transportation investments to mitigate the impacts. Additional mitigation measures likely also would be needed for Alternative 1—No Action to maintain the City's current LOS standards in 2035.

It is estimated that Alternative 4 – Preferred Alternative would take 80 to 125 years or more to reach build-out of the proposed zoning capacity. Alternative 3—Previous Most Growth could take 60 to 100 years or more and Alternative 2—Some Growth would take 30 to 50 years or more to reach build-out.

Multimodal transportation improvements required to support the growth of any of the alternatives could be funded incrementally through a variety of sources, including federal and state grants, and cycles of capital improvement plans. The length of time to build-out would enable the City to monitor growth and proactively plan for needed improvements over time. The City also intends to pursue a variety of transportation demand management strategies to mitigate and minimize traffic congestion and reduce vehicle miles traveled, consistent with the Climate Action Plan and other City plans and policies.

N-NE 185th Street will be a major conveyor for all modes to get to and from the station. A conceptual design has been developed that would, if implemented, enhance connectivity in the corridor. The improvements conceptualized would improve mobility for pedestrians, bicyclists, and transit services, as well as automobile traffic. The concept envisions a raised cycle track that would separate bicyclists from transit, as well as generous sidewalk widths. Three lanes would be provided for traffic and transit (one westbound, one eastbound, and a center turn lane). **Figure 3.3-20** and **Figure 3.3-21** illustrate this conceptual design.

If current travel patterns continue, the build-out of Alternative 2—Some Growth (30 to 50 years from now or more) may necessitate widening of N-NE 185th Street beyond three lanes from Aurora Avenue N to 5th Avenue NE. Similarly, with full build-out of Alternative 3—Previous Most Growth and Alternative 4 – Preferred Alternative (60 to 100 years from now or more) the full length of the corridor may need to be widened. However, in the coming years the City would pursue a full range of options to minimize traffic congestion on N-NE 185th Street to avoid the need to widen the street for as long as possible. For example, new development sites along the corridor likely would be required to have access from the side streets and/or rear alleyways and not directly onto N-NE 185th Street. This would reduce the amount of traffic that directly impacts the N-NE 185th Street corridor. Access management (reduced curb cuts/driveways), as well as a new system of well-connected blocks, road connections, non-motorized facilities, and alleyways would serve corridor development, taking pressure off N-NE 185th Street. This would improve overall travel flow for all modes and enhance pedestrian and bicyclist safety.

The City intends to work with transit providers to increase connectivity to and from the station. The City is also interested in exploring bike station programs and other actions.

Many of the projects identified as mitigation for the alternatives would require additional street right-of-way near the intersection locations, and if N-NE 185th Street had to be widened in the long term future, additional easements or right-of-way would need to be obtained. These could be determined through a corridor development plan, which would need to be completed following adoption of the subarea plan. As a means to reduce the amount of infrastructure necessary to accommodate future growth, the City may look to revise its concurrency standards to allow for LOS E in certain situations. Also, behavioral change and new technologies (such as driverless cars) may increase road capacity, making future expansion of 185th beyond three lanes unnecessary.

Figure 3.3-14 Conceptual Cross Section for N-NE 185th Street

Figure 3.3-15 Perspective View of N-NE 185th Street Concept

Mitigation Measures for Each Alternative

In addition to the roadway improvements called out in the TMP[14], the following measures are recommended for the alternatives analyzed in this FEIS.

Alternative 4—Preferred Alternative (Build-Out) and Alternative 3—Previous Most Growth (Build-Out)

Mitigation measures for Alternative 4—Preferred Alternative and Alternative 3—Previous Most Growth are the same given that these would generate similar levels of traffic at full build-out.

General Street and Intersection Improvement Mitigation Measures

- Additional through-lanes along N-NE 185th Street from 10th Avenue NE to Aurora Avenue N
- Additional right-turn pockets for the eastbound and westbound approaches along N 185th Street at the intersection with Meridian Avenue N
- Additional through-lanes in the northbound and southbound direction along Meridian Avenue N between N 175th Street and N 205th Street with a right-turn pocket on the northbound approach to N 185th Street
- Dual left-turn pockets for the southbound approach at 1st Avenue NE and NE 185th Street
- Right-turn pocket for the westbound approach at 5th Avenue NE and NE 185th Street
- Two-way left-turn lane along 5th Avenue NE between NE 175th Street and NE 185th Street
- Dual left-turn pocket for eastbound approach at 15th Avenue NE and NE 175th Street
- Northbound right-turn lane at N 175th Street and Meridian Avenue N
- Signalization of the following intersections:
    - NE 185th Street and 5th Avenue NE
    - NE 185th Street and 7th Avenue NE
    - NE 185th Street and 10th Avenue NE
- Signalization or roundabout conversion of the following intersection:
    - NE 180th Street and 10th Avenue NE
- Widening of the intersection of 5th Avenue NE and NE 175th Street to facilitate bus turns from EB NE 175th St to NB 5th Avenue NE. Only smaller buses can make the turn today
- NE 175th Street and the I-5 Ramps are within WSDOT jurisdiction and would require additional mitigation

In addition to the above projects, which were based on the City's LOS standards, the City should engage as needed in traffic calming measures along non-arterial streets to prevent cut-

[14] For example, where the TMP recommends a center-turn lane along Meridian Avenue, that profile is assumed in addition to the recommended improvements stated in this section.

through traffic both to the light rail station and new development sites. The City of Shoreline has a Neighborhood Traffic Safety Program to help address the safety concerns on residential streets stemming from higher speed and/or cut-through traffic. This program includes enhanced enforcement and education, along with engineering solutions such as traffic circles, speed humps, and narrowed lanes. Solutions to address traffic issues are discussed and implemented as part of a public process to ensure they appropriately address a given circumstance.

Transit Service Mitigation Measures

For all alternatives, at least 22 buses are expected to serve the future light rail station during the PM peak hour, or roughly one bus every three minutes. Depending on final design of the station, ample bus pull-out and layover space should be provided to maintain operations efficiency and prevent spillover impacts to the roadway network.

The City of Shoreline should continue coordinating with area transit agencies in the development of a Transit Service Integration Plan (TSIP) for the light rail station subarea. This coordination should coincide with traffic analysis to ensure transit service reliability along the major corridors in the area. Transit reliability can be improved via a number of transit priority treatments including signal priority, bus bulbs, and bus queue jump lanes. These measures should be evaluated as part of the TSIP. Additionally, on-demand transport such as the King County Metro Access and the Hyde Shuttles should have direct service to the light rail station bus access point in order to improve service for those with mobility limitations.

Additional modes that could operate in coordination with transit include bike sharing or car sharing programs, with organizations such as Zipcar, Car2Go, or Puget Sound Bike Share ("Pronto"). An analysis of potential demand for these services should be conducted to determine their relative feasibility.

Parking Mitigation Measures

While any new development is required by City code to provide ample off-street parking for the demand generated by its respective use, there are options to reduce the overall amount of parking supply created. City code stipulates that development may reduce its parking supply requirement by up to 25 percent by using a combination of the following criteria:

- Shared parking agreement with adjoining parcels and land uses that do not have conflicting parking demands
- High-occupancy vehicle (HOV) and hybrid or electric vehicle (EV) parking
- Conduit for future electric vehicle charging spaces, per National Electrical Code, equivalent to the number of required disabled parking spaces
- High-capacity transit service available within a one-half mile radius
- Concurrence with King County Right Size Parking data, census tract data, and other parking demand analysis results

While the Preferred Alternative has more development and higher trip generation than other alternatives, it also provides greater opportunity to take advantage of these code provisions. Alternative 1—No Action by contrast lends itself to more auto-oriented development that is not as conducive to measures like

shared parking. Besides mitigating parking demand generated from new development, any on-street parking spillover generated from the proposed land uses or the light rail station may be mitigated via a Residential Parking Zone (RPZ) designation. An RPZ provides on-street parking permits to residents located within the zone to help discourage long-term parking by non-residents on non-arterial streets. An evaluation of parking demand in the area as it redevelops following implementation of light rail service should be conducted on an annual basis to assess the need of an RPZ designation. Additional measures that may be taken to address parking impacts include:

- Install signage and driver information to direct commercial and light rail users towards available off-street parking garage locations near commercial development
- Implement variable parking time limits and prices to moderate parking demand and ensure sufficient supply during peak parking periods
- Evaluate the provision of additional off-street parking supply near commercial areas

Pedestrian and Bicycle Facilities Mitigation Measures

Additional traffic along N-NE 185th Street along with increased bus service will create a higher potential for conflicts between bicyclists, pedestrians, transit vehicles, and automobiles. One possible measure to properly accommodate all modes could be a cycle track from the Interurban Trail to 10th Avenue NE. A facility of this nature would allow for a safe non-motorized connection via the key N-NE 185th Street corridor while separating bicycles from vehicles and pedestrians. The Preferred Alternative could improve overall pedestrian and bicycle connectivity by allowing for more dedicated pathways with parcel consolidation and expanded development. Any new development in the area under the proposed zoning should consider pedestrian and bicycle paths through the sites to allow for connections to the station and subarea amenities without the need to travel along busy arterials.

A dedicated path along the I-5 right-of-way near the proposed light rail alignment could provide a connection between the station and the pedestrian and bicycle bridge at NE 195th Street, and would provide a connection to the regional trails such as the Interurban Trail and the Burke-Gilman Trail. Additionally, bicyclists from Lake Forest Park and areas to the northeast and east of the subarea may utilize Perkins Way as an access route to the station.

While the City is currently upgrading Perkins Way with bicycle signage as part of the Interurban and Burke-Gilman Connector project, a more separated facility to accommodate bikes may be needed. Conversely, traffic volumes from new development along 10th Avenue NE may necessitate the installation of bicycle lanes to provide a safer bicycling environment.

The City is interested in exploring opportunities for bicycle sharing and bicycle storage facilities near the station to encourage and enhance bike access to transit. This likely would encourage more use of the N-NE 185th Street/10th Avenue NE/NE 180th Street corridor as a bicycle connection to and from the station.

The First Twenty Years (Up to 2035) for Any Action Alternative

As stated in previous sections, the length of time until full build-out of any action alternative would enable the City to monitor growth and proactively plan for needed improvements. This should occur as development proceeds in order to provide a sustainable and efficient transportation system within the subarea.

In the meantime, the next twenty years will bring an important focus on funding and implementing projects to support anticipated growth through 2035. This section details specific actions the City can take to address growth that is forecast for 2035.

N-NE 185th Street

The main corridor within the subarea is also the primary connection to the station and will most likely experience the largest amount of trip growth. Current daily volumes of up to 9,700 along the corridor are far below capacity and do not necessitate any infrastructure improvements beyond what has already been identified in the Shoreline Transportation Master Plan and the Lynnwood Link Extension Preferred Alternative. Based on forecast volumes, N-NE 185th Street may carry up to 20,000 vehicles per day; approaching the theoretical capacity of the corridor. Beyond what has already been identified in the TMP, the City should take the following actions as appropriate during the 20-year horizon to properly manage changes in travel patterns along this corridor.

- Travel demand management strategies to reduce overall vehicle trips along the corridor. This includes continued expansion of the bicycle and pedestrian network along with transit service priority measures
- Continue to monitor traffic volumes on a bi-annual basis to identify changes in congestion patterns
- Employ access management strategies for new development to reduce the number of curb cuts and access points along N-NE 185th Street
- Expand signal coordination and other Intelligent Transportation Systems (ITS) strategies.
- Consistent with the TMP, reconfigure the intersection of N 185th Street and Meridian Avenue N
- Provide protected/permitted phasing for northbound and southbound left-turn movements at N 185th Street and Meridian Avenue N
- Signalization of the intersections along N-NE 185th Street at 5th avenue NE and 7th Avenue NE may be necessary depending on actual station and parking garage-access volumes with implementation of light rail service in 2023
- As traffic volumes approach the capacity of N-NE 185th Street, evaluate adding lane capacity from Aurora Avenue N to 7th Avenue NE.

Parking Management Strategies

Monitoring and managing parking issues in the subarea should be an important focus of the first twenty years of implementation. As demand for parking shifts with the light rail service and changes in development, the City has a number of parking

management strategies that are common elements in Transit-Oriented Development.

- *Residential Parking Zones (RPZ)* – Implementation of an RPZ would help discourage long-term parking within residential areas by retail or light rail station users.
- *Time limits and restrictions* – Time limits can help limit parking spillover into residential areas and can also improve parking turnover in commercial areas.
- *Parking location signage* – Information directing drivers to available off-street parking locations can improve vehicle circulation and ensure that parking supply is utilized.
- *Variable parking pricing* – Changes in parking rates based on time period and demand can help moderate available supply.
- *Additional off-street parking supply*- If existing parking facilities are being efficiently used, then the City or property owners may consider adding off-street parking to ease the pressure off of on-street supply.

Transit Service Improvements

Transit service integration and improvements will be an important priority after the light rail station is operating. As part of the TSIP currently under development, the City should specifically focus on the N-NE 185th Street/10th Avenue/180th Street corridor to ensure transit vehicles can operate efficiently through the subarea. Strategies the City may employ include the construction of signal priority systems, queue jumps, and bus bulbs. Specifically, these solutions should target potential chokepoints along N-NE 185th Street, such as Meridian Avenue N and/or 5st Avenue NE. Additionally the plan should evaluate the potential signalization of NE 185th Street and 7th Avenue NE to allow for efficient access of busses into and out of the light rail station.

Pedestrian and Bicycle Facilities Mitigation Measures

The mitigation measures listed for Alternative 4—Preferred Alternative (Build-Out) should all be an important focus of the first twenty years of implementation. Refer to the measures listed on pages 3-156 and 3-158.

Alternative 2—Some Growth

- Transportation demand strategies and actions to minimize traffic congestion on N-NE 185th Street, Meridian Avenue N, and other key corridors in the subarea
- Additional through-lanes in the eastbound and westbound direction along NE 185th Street from Aurora Avenue to 5th Avenue NE could be needed to support full build-out of this alternative, if other mitigation measures are unsuccessful in controlling traffic levels
- Additional through-lanes in the northbound and southbound direction along Meridian Avenue N between N 175th Street and N 205th Street if transportation demand strategies are unsuccessful
- Right-turn lane for westbound approach at N 175th Street and Meridian Avenue N
- Right-turn lane for the northbound approach at N 175th Street and Meridian Avenue N
- Signalization of the following intersections:
  - NE 185th Street and 5th Avenue NE
  - NE 185th Street and 7th Avenue NE
- Signalization or roundabout conversion of the following intersections:
  - NE 185th Street and 10th Avenue NE
  - NE 180th Street and 10th Avenue NE
- Widening of the intersection of 5th Avenue NE and NE 175th Street to facilitate bus turns from EB NE 175th Street to NB 5th Avenue NE. Only smaller buses can make the turn today.
- NE 175th Street and the I-5 Ramps are within WSDOT jurisdiction and would require additional mitigation

N-NE 175th Street

- Consistent with the TMP, reconfigure the intersection of N 175th Street and Meridian Avenue N
- NE 175th Street and the I-5 Ramps are within WSDOT jurisdiction and may require additional mitigation

1st Avenue NE

- Consistent with the TMP, add bicycle lanes along 1st Avenue NE from the 195th Street trail to NE 185th Street

5th Avenues NE

- Consistent with the TMP, reconstruct 5th/7th Avenue NE with full sidewalk coverage and bicycle lane provision from NE 175th Street NE to NE 185th Street, and 5th Avenue NE from NE 185th Street to NE 195th Street.

Meridian Avenue N

- Continue to monitor traffic volumes on a bi-annual basis to identify changes in congestion patterns
- Consistent with the TMP, convert Meridian Avenue N to a three-lane profile with a two-way left-turn lane and bicycle lanes

10th Avenue NE

- Consistent with the TMP, install sidewalks on both sides of the street from NE 175th Street to NE 195th Street

NE 180th Street

- Consistent with the TMP, install sidewalks on both sides of the street from 15th Avenue NE to 10th Avenue NE

Perkins Way

- While future traffic volumes for Perkins Way are forecast to be within the capacity of the roadway, the City should continue to evaluate bicycle facilities to improve connections from northeast of the station.

Potential I-5 Non-Motorized Trail

- Work with Sound Transit to identify potential locations for a non-motorized trail along the right-of-way secured for the light rail alignment on the east side of I-5. This trail would provide a dedicated north-south connection from the NE 195th Street pedestrian and bicycle bridge to the station.

Alternative 1—No Action

- Timing adjustment and phase changes for northbound and southbound movements at N 175th Street and Meridian Avenue N
- NE 175th Street and the I-5 Ramps are within WSDOT jurisdiction and would require additional mitigation

3.3.4 Significant Unavoidable Adverse Impacts

Under all alternatives, the subarea would be anticipated to experience growth in traffic levels. Given that growth is expected to occur incrementally over many decades, the City and other agencies responsible for transportation services would be able to proactively monitor changes, update plans, and implement needed improvements to address the increased transportation demand. Behavioral changes in the way people travel (such as reduced vehicle household trips in a more walkable neighborhood, use of bike share and car share programs, and increased use of the high-capacity transit system) also would help to offset some of the demand over time. Given these considerations and with implementation of mitigation measures, no significant unavoidable adverse impacts would be anticipated.